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The management issues of implementing telecommuting: a case study

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THE MANAGEMENT ISSUES OF
IMPLEMENTING TELECOMMUTING:
A CASE STUDY

by

Chuck Howard Bane, Jr.

September, 1993

Thesis Advisor: Susan P. Hocevar

94-03291

94 2 01 10 5

REPORT DOCUMENTATION PAGE

1a REPORT SECURITY CLASSIFICATION: Unclassified	1b RESTRICTIVE MARKINGS
2a SECURITY CLASSIFICATION AUTHORITY	3 DISTRIBUTION/AVAILABILITY OF REPORT
2b DECLASSIFICATION/DOWNGRADING SCHEDULE	Approved for public release; distribution is unlimited.

4 PERFORMING ORGANIZATION REPORT NUMBER(S)		5 MONITORING ORGANIZATION REPORT NUMBER(S)
6a NAME OF PERFORMING ORGANIZATION Naval Postgraduate School	6b OFFICE SYMBOL (If applicable) 37	7a NAME OF MONITORING ORGANIZATION Naval Postgraduate School
6c ADDRESS (city, state, and ZIP code) Monterey CA 93943-5000		7b ADDRESS (city, state, and ZIP code) Monterey CA 93943-5000
8a NAME OF FUNDING/SPONSORING ORGANIZATION	8b OFFICE SYMBOL (If applicable)	9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER

8c Address (city, state, and ZIP code)	10 SOURCE OF FUNDING NUMBERS			
	Program Element No	Project No	Task No	Work Unit Accession No

11 TITLE (include security classification)
The Management Issues of Implementing Telecommuting: A Case Study

12 PERSONAL AUTHOR(S) Bane, Chuck Howard Jr

13a TYPE OF REPORT Master's Thesis	13b TIME COVERED From To	14 DATE OF REPORT (year, month, day) 93 September	15 PAGE COUNT 95

16 SUPPLEMENTARY NOTATION The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

17 COSATI CODES			18 SUBJECT TERMS (continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUBGROUP	Telecommuting, Telecommuter, Telework, Telecommuting Workcenter, Telecommuting Workcenter of Riverside County, CalComp (A Lockheed Company)

19 ABSTRACT (continue on reverse if necessary and identify by block number)
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Using this study as background, the military use of telecommuting for U.S. Navy detailers will be developed. Developing a peace time telecommuting program could help train Navy personnel to function as a remote staff member for a Battle Group or Joint Commander. A conceptual application of telecommuting for the Department of the Navy (DON) could be to allow selected officer and enlisted detailers to telecommute up to three days a week. This insight, properly used, will help program managers avoid problems that other programs have experienced during their transition to telecommuting. This insight, properly used, will help the program managers avoid problems other programs have had during the transition to telecommuting. Recommendations for further research and use of telecommuting for the Department Of The Navy are provided.

20 DISTRIBUTION/AVAILABILITY OF ABSTRACT X unclassified/unlimited __ same as report __ DTIC users	21 ABSTRACT SECURITY CLASSIFICATION Unclassified	
22a NAME OF RESPONSIBLE INDIVIDUAL Prof. Susan P. Hocevar	22b TELEPHONE (Include Area Code) (408) 656-2249	22c OFFICE SYMBOL Code As/Hc

DD FORM 1473, 84 MAR   83 APR edition may be used until exhausted   SECURITY CLASSIFICATION OF THIS PAGE
                              All other editions are obsolete   Unclassified

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The Management Issues of Implementing Telecommuting:
A Case Study

by

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Submitted in partial fulfillment
of the requirements for the degree of

MASTER OF SCIENCE IN INFORMATION TECHNOLOGY MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
September 1993

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ABSTRACT

This thesis is a case study of the implementation of telecommuting by CalComp at the Telecommuting Workcenter of Riverside County and is a real life example of the management issues that surround telecommuting. The issues brought forth in this study will enable those responsible for implementing a telecommuting program to better understand the impact of this change on their organization and how a telecommuting center may be used in their program.

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ACKNOWLEDGMENTS

No literary work would be complete without thanking the person that made it all possible. Thanks to my wife Pam for all of the support, the long hours of editing, and always being there to listen. Without her, I would have never slain the dragon.

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I. INTRODUCTION

"Imagine the workplace of the future. Imagine an office that's easy to reach, and not on the far side of a commute that leaves your mind numb, your body shaken. Imagine an office in which you feel totally at ease—a place tailored to your individual needs and tastes. Imagine an environment where you feel free, and not like a prisoner enslaved by a rigid schedule. Imagine your own HOME." (Crossen, 1990, p. R6)

- Cynthia Crossen -

A. BACKGROUND

The industrial revolution of the 19th century started a trend to a centralized workplace. The reason was simple: industries, factories and assembly plants needed centralization. To be run efficiently, a critical mass of personnel, material, and transportation had to be brought together. From these changes developed the industrial age and a model of organizational efficiency that exists today. This model of how industry works pervades our society, our government, and all parts of business. It is used whether or not collocation of key resources, processes, or people are required. (JALA (b) 1990, NRC 1985)

We are now in a different revolution; a revolution that is taking us from a world of manufacturing and heavy industry to the information age. According to the Bureau of the Census, almost 60% of the U.S. workforce now represent information or knowledge

workers; their jobs derive from their creating, collating, manipulating data or from their operation of information machines, such as typewriters and computers (JALA (b) 1990).

These information and knowledge workers can perform their jobs virtually independent of their location with proper telecommunications. This independence of location is what lead Dr. Jack Nilles to coin the word "Telecommuting" for a new method of distributed work. Telecommuting, according to *Newton's Telecom Dictionary*, is "the process of commuting to the office through a communications link rather than transferring one's physical presence". This thesis is a review of the history of telecommuting and the issues of its implementation. Using this study as background military use of telecommuting for U.S. Navy detailers will be development. The accompanying case study describes the process, limitations, and benefits of a traditional management organization implementing telecommuting using a Telecommuting Center. The information is presented in a case study format that covers the period from April 1992 to April 1993.

B. RESEARCH QUESTIONS

Prior research reveals that a successful telecommuting program has the following benefits:

- Flexibility: a system that has proven to be successful with many different types of organizations
- Efficiency: increases productivity (gains from 10% to 30%)
- Economy: decreases the cost of transportation for the commuter, reduces down time and lost time from absenteeism and stress related medical problems, and in some cases reduces the cost of office space
- Environmental Soundness: better for the environment by decreasing transportation requirements

- Morale Enhancement: improves the overall quality of life for the commuter

These points are supported by telecommuting studies of transportation and the environment, the conclusion being that telecommuting is good for the environment and can greatly reduce the strain on the highway infrastructure of the United States. These studies have also shown that there is an increase in productivity and a decrease in absenteeism in organizations using telecommuting. (NRC 1985, Nolan 1989, JALA (a) 1990, Hawaii 1991, Washington (b) 1992).

If the results of these studies and pilot programs are true, then why are more companies not using telecommuting as a management option? The purpose of this research is to seek answers to the following questions:
- What are the management issues of implementation of telecommuting?
- What management issues do telecommuting centers address?
- What effect does a telecommuting center have on these issues?

C. METHODOLOGY[1]

1. Case Study for Research Purposes

Historically, a common misconception among traditional research theorists was that the various research strategies should be arrayed hierarchically. It was believed that case studies were appropriate for the exploratory phase of the investigation, that surveys and histories were appropriate for the descriptive phase, and that experiments were the only way of doing explanatory or causal inquires. Thus, case studies were

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[1] The Methodology section of this thesis was modeled after the Methodology section of the Naval Postgraduate School thesis *Information Resource Management Aboard USS CORINTH (CG-44): A Case Study* by Cheryl L. Gonzalez.

considered to be at the bottom of the research hierarchy. Case studies were often used as the preliminary part of other types of research. (Yin 1988, p. 15, Gonzalez 1991)

It is more recently argued that the more appropriate view of these different strategies is a pluralistic one. According to Yin in *Case Study Research Design and Methods*:

> Each can be used for all three purposes (exploratory, descriptive, or explanatory) and, for example, there may be exploratory case studies, descriptive case studies, or explanatory case studies. What distinguishes the strategies is not this hierarchy, but three other conditions. The three other conditions consist of: (a) the type of research questions posed, (b) the extent of control an investigator has over actual behavior events, and (c) the degree of focus on contemporary, as opposed to historical, events (Yin 1988 p.16).

Then, the definition of a case study is as following (Yin, 1988, p. 23):

A case study is an empirical inquiry that:

- Investigates a contemporary phenomenon within its real life context
- Has boundaries between phenomenon and context which are not clearly evident
- Uses multiple sources of evidence

There are five research strategies recognized within the social sciences: experiment, survey, archival analysis, history, and case study. Case study, history, and experiment are the only research strategies that will be addressed. They are used to answer the "how" or "why" research question. A case study focuses on contemporary phenomena where there is no control by the researcher over the behavior of the persons involved in the case. History's focus is on past phenomena with no requirement to control behavioral events. The case study research method has the advantage of adding direct observation and interviews when compared to history. This advantage is due primarily to the difference in research focus, present versus past. Experiments, on the other hand,

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focus on contemporary phenomena and require control over behavior. Traditionally, researchers have emphasized quantitative and controlled events in an effort to generalize the results, as well as, replicate the event. Today, these researchers recognize the benefits obtained from case research as being more than an analysis of decisions or events. (Yin 1988)

The case study as a research strategy has been used in many different areas (Yin 1988):

- policy, political science, and public administration research
- community psychology and sociology
- organizational and management studies
- city and regional planning research, such as studies of plans, neighborhoods, or public agencies, ...

2. Advantages of Case Studies

Case studies prove a description of "holistic and meaning characteristics of such real life events as life cycles, organization and managerial processes, neighborhood change, international relations, and maturation of industries," (Yin, 1988, p. 14). Case study research has a unique strength in its ability to assemble multiple sources of information and present this evidence as a whole, complete picture. It captures a complete understanding of the entire situation, including cause and effect relationships. "As a research endeavor, the case study contributes uniquely to our knowledge of individual, organizational, social, and political phenomena (Yin, 1988, p. 14)."

Qualitative data in the form of words give the case study method another advantage. Qualitative data are a "source of well-grounded, rich descriptions, and explanations of processes occurring in local contexts (Miles, 1984, p. 15)."

Personal feelings and opinions, documented through interview and observation, are a vital source of information in understanding decisions made in any given situation. Attitudes, relationships among personnel, and the power and influence within the organization are portrayed with words. "Words, organized into incidents / stories provide a concrete, vivid, meaningful flavor that often proves far more convincing to a reader . . . than a page of numbers (Miles, 1984, p. 15)."

3. Disadvantages of Case Studies

The qualitative advantage found in case study research is also contributing to the difficulty in accepting the case study method as a key research strategy. Words, often having a variety of meaning, are subject to interpretation and can therefore bias the researcher's view of the situation. Also, "observations tend to be unique and non-repeatable (Lee, 1986, p. 2)" . This suggests that another researcher would not be able to replicate the entire case study. In addition, case study research does not conform to a standard and accepted method of data analysis. This lack of common language contributes to the uncertainty of the case study. Case study researchers in the past have been found to influence the case study results.

Several other drawbacks to the case study method are also apparent. Case study preparation is time-consuming and their documentation is voluminous. In addition, one who favors the quantitative viewpoint may be skeptical of case study research

because there is the tendency to draw generalizations from the conclusions and apply them to other situations. This, however, is not the intent of case study conclusions.

> Case study conclusions are generalizes to theoretical propositions and not to populations or universes . . . In this sense a case study does not represent a 'sample' and the investigator's goal is to expand and generalize theories (analytic generalization) and not to enumerate frequencies (statistical generalization) (Yin, 1988, p. 21).

4. Methodology of Thesis Case Study

This case study will concentrate on the issues encountered by management and telecommuters of CalComp during the establishment of telecommuting. The case was developed by a review of written documentation of CalComp's telecommuting program and company history. This information was supported by personal interviews with CalComp's formal telecommuters, telecommuter supervisors, ride-share coordinator, and an equal number of non-telecommuter supervisors. The telecommuting center used by CalComp to implement its program is the Telecommuting Workcenter of Riverside County (TWRC). Information for the center was gathered by a review of the state bill (AB 3069) founding the center, TWRC documentation on telecommuting programs, and personal interviews with the management and staff of the center.

In support of the case, a general background review of telecommuting was conducted using written documentation, interviews, and direct observation. Written documentation includes a review of books, manuals, and periodicals in which the main topic was telecommuting and a review of management theory as it applied to the initial implementation of telecommuting. All interviews were conducted in person, and on site if possible, with the exception of Mr. Frank Schiff and Dr. Wendel Joice, whose

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interviews were conducted by phone. The people and organizations were chosen to concentrate in one region, primarily the west coast of the United States, and in particular the LA Basin area. The interviews were with the following people or groups:

- The telecommuting center managers for:
  1. Washington State Energy Office
  2. Ballard Neighborhood Telework Center
  3. Ontario Telebusiness Center
  4. Telecommuting Workcenter of Riverside County (TWRC)

- The telecommuting managers or ride share coordinators for:
  1. Southern California Edison
  2. GTE
  3. Washington State Energy Office
  4. Pacific Bell
  5. CalComp
  6. TRW

- Telecommuting Consultants:
  1. Carol Nolan
  2. John Niles
  3. Dr. Charles Grantham
  4. Dr. Wendell Joice
  5. Frank Schiff

- Individual CalComp interviews:
  1. Telecommuters — 6
  2. Telecommuter's supervisors — 3
  3. CalComp Department Heads — 4

There were a total of 28 individual interviews held. All interviews were semi-structured with focus questions available if needed. The interviews were one-on-one with the author and lasted from 15 minutes to 2 hours. Interviews were audio taped and then transcribed into the thesis as research continued. The interviews were structured as follows:

- Introduction and background of author
- Background of telecommuting and goals of the thesis
- Background of interviewee
- Interview discussions: Typical questions asked or issues voiced by interviewees.
  1. Why telecommute?
  2. What do you see as the impact of telecommuting on your management organization?
  3. What are the issues that you had to work around to make telecommuting work for you?
  4. What about productivity?
  5. What changes in day-to-day operations can you contribute to telecommuting?
  6. Why does the impact on management change if the location of the work changes?
  7. What is the purpose of a telecommuting center?
  8. What was the selection process that was used to select you to telecommute?
  9. What training was offered or given to the telecommuters and their supervisors?
  10. What equipment do you use in telecommuting and what equipment do you need to complete your job?
- Closing with Thanks for the support

D. ORGANIZATION OF THESIS

Following this introductory chapter, the thesis is broken down into four chapters and two appendices. Chapter II is a literature survey of telecommuting and a review of several past and ongoing telecommuting projects and case studies. Chapter III contains a case study of the development of a telecommuting program and the telecommuting center through which it was implemented. Chapter IV presents telecommuting as a change issue using management change theory to reflect on how telecommuting issues were handled at the case study site. Chapter V contains the conclusions and recommendations in accordance with the stated research questions. Appendix A is a policy memorandum for CalComp's Pilot Telecommuting Program. Appendix B is a list of contributors to the Telecommuting Workcenter of Riverside County.

II. TELECOMMUTING: 1973 TO 1993

A LITERATURE SURVEY

> "... commuting to office work is obsolete. It is now easier, cheaper and faster to move information and with it office work to where people are. The tools to do so are already here: the telephone, two-way video, electronic mail, the fax machine, the personal computer and so on ..." (Hawaii (b) 1992)
>
> - Professor Peter F. Drucker-

A. INTRODUCTION

1. What is Telecommuting?

Telecommuting moves work, not people. This concept dates to the late 1960's and early 1970's when writers began writing about workers working from home. Alan Kiron (1969) talked about "dominetics" (people who perform their normal jobs from home) in his *Washington Post* article, while Jack Nilles (1974) started to develop, more fully, the idea of telecommuting. Frank Schiff introduced the "flexiplace" concept in 1979, and since that time, project and programs have been completed. (NRC 1985, Schiff 1993)

While the concept had its beginnings in the late 60's, the first real use didn't come about until 1973, when one company began an experimental program (NRC 1985). By 1992 one in five major US. firms reported having telecommuting workers (Link (a) 1992). LINK Resources reports that in 1992 the number of employees that telecommute

had risen to 6.6 million, a 20% increase from the 5.5 million found in 1991 (Link (b) 1992) , and the number of these workers is expected to triple over the next 10 to 15 years (Perez-Pena 1992).

The 20% growth in telecommuting is not solely based in a single issue. Technology, political issues, environmental issues, social issues and a shift in the demography of the workforce have all played important roles. Telecommuting was first seen as a way of working at home with no commute at all. This concept is not always well received in business, due to the perceived loss of control by middle managers (Downey 1992). This has prevented many companies from fully using the concept (Ramsower 1985, NRC 1985). To overcome this problem a new configuration was developed; the telecommuting work center. (Morton 1992, Nolan 1992). Currently there are three configurations of telecommuting (Pacific Bell 1992):

* **Work at home:** This is the most popular form of telecommuting (by telecommuters). The employee designates work space at home to conduct business functions.
* **Satellite office:** This configuration enables employees from different functional units of an organization (e.g., accounting, human resources , data processing) to work together sharing office technology. The primary consideration in configuring a satellite office is locating the office in an area where a high concentration of employees live. The employees share a common interest of living in the same general vicinity as opposed to having similar job functions.
* **Neighborhood Work Center:** This configuration builds upon the satellite office concept and takes it one step further by establishing office space for employees from multiple organizations at a single site to share office technology. Again, the employees reside in the general vicinity of the neighborhood work center.

2. Telecommuting Programs

Telecommuting programs vary greatly from company to company. The typical program is set up so that the employees can work one to three days a week from a remote location. For example CalComp Inc. uses the following guideline for their Telecommuting Program: "Under this program, the telecommuter will work up to two (2) days per week at the Telecommuting Work Center of Riverside County . . . . (CalComp (a) 1992 p. 1)".

Who may Telecommute also varies. It can apply to all personnel living in the area of the center, or a small interdisciplinary group selected on the basis of job description, as in the Pacific Bell case:

> The telecommuting work option is available to management employees only; the possible applicability of telecommuting to non-salaried jobs in the future would be a subject of union negotiation. (Washington (a) 1992 Appendix B p. B-26)

There is no formal definition of a successful telecommuting program, however, there are implementation models that have been successful in a variety of industries and business settings. A successful program shows management that telecommuting will work in their particular industry or business area. There are no hard and fast rules for this development and many guidelines are offered. For example, Gil Gordon has developed these six steps to success (Gordon 1986 p. 48):

- Select the jobs
- Select the people
- Train the manager
- Train the telecommuters
- Link the telecommuters to the office
- Take care of technical details

A different set of eight steps to successful implementation was published in the Pacific

Bell's Telecommuting Guide (Pacific Bell 1992):

- Obtain top management support
- Determine the responsibility for administration
- Design the program
- Identify resource materials (agreement, training class, handbook, evaluation)
- Publicize the program
- Encourage participation in the program
- Monitor and evaluate the results
- Upgrade the program when necessary

In the JALA Associates' report to California State, Jack Nilles outlines a

different set of important factors and points out that:

> While telecommuting has many benefits, there also are potential problems that can be mitigated by careful planning and design of the agency's telecommuting program. Successful telecommuting requires thorough orientation, support of top management, a controlled pilot, careful selection of managers/supervisors and telecommuters, focused training for participants and their peers, and ongoing monitoring and evaluation. (JALA (a) 1990 Appendix B).

All of these sources say that if these guidelines are followed you will have a successful

program.

B. EARLY RESEARCH AND PROJECTS

In 1973 the first company in the United States to experiment with the concept of

telecommuting was Blue Cross / Blue Shield of South Carolina. Their program called

Program for Clerical Workers, developed a telecommunications network linking all of

the hospitals in South Carolina together. This system allowed these hospitals to

electronically file their insurance claims directly with the home office in the state

capital, Columbia. With this paperless system in place in 1978, Blue Cross / Blue Shield

of South Carolina started a pilot project for the coding and keying of the physicians' Blue

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Shield claims by husband and wife teams. The husband typically worked full time for Blue Cross / Blue Shield of South Carolina, and had full company benefits. His wife worked as the "cottage keyer". The cottage keyers and coders were generally women, in their thirties, with one young child at home. The keyers were all well-organized and self-disciplined. In the first five years the company did not have a single turnover of keyers. The project was very successful. The standards set at the company were based on an "optimum day's work," not a "fair day's work" and the "cottage keyers" typically outperformed the in-office keyers by as much as 28%. In addition to the productivity increase, the error rate for the in-office keyer was 2.5% higher that the error rate of the "cottage keyer". (NRC 1985)

During this period Nilles (1976) conducted one of the first studies of the tradeoffs between telecommuting and transportation. The aim of the University of Southern California research group was to define the critical elements of the substitution and identify the key policy areas associated with the substitution of telecommunications for transportation (Nilles 1976). In general this study found that the new information worker did not have to work at the central office to productively perform his/her job and that almost all of the routine operations could be performed using off-the-shelf computer, software, and telecommunications technologies (Nilles 1976). The Nilles group studied 2048 insurance company employees in Los Angeles and found that, on average, they traveled 21.4 miles a day with higher management employees averaging 33.2 miles. These findings, in 1974 prices, cost twenty-two cents per mile or a total of $2,730,000 per year (Toffler 1980). The Nilles premise was that a time would come that

telecommuting / telecommunications cost would be much less. This work lead the way

for much of the academic research done in telecommuting covering both the projected

technical requirements and the human factors of telecommuting.

Schiff (1983) published two personal articles on telecommuting, and as a personal

effort, helped get the task force started to develop what became the *Flexiplace Program*

(a program for government employees to telecommute) (Schiff (a) 1993). He identified

the following as sources of opposition as well as advantages to telecommuting (Schiff

1983):

Opposition
- Supervisor / Manager's concerns regarding the management of remote employees
- Isolation of the employee from the normal workplace
- Possible inadequate facilities or conditions at home

Advantages
- Savings of time and money by not having to commute
- Opportunity to choose an affordable place to live (away from high cost areas of the business)
- Improvement the overall quality of life for the telecommuter
- Addition of people to the work force that would not have been able to commute to the work place each day (physically challenged)
- Increased morale and productivity

In 1983 the definitions of jobs suited to telecommuting, as well as the

characteristics of successful remote employees (telecommuters) started to develop.

Interviews conducted by Professor Margrethe H. Olson (1985) with telecommuters

through the technical publication *Datamation* , found a common set of job characteristics

were independent of technology or job level:
- Minimum physical requirements
- Individual control over work pace
- Defined deliverables

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- Need for concentration
- Defined milestones
- Relatively low need for communications

Olson also defined the successful telecommuters themselves, finding them to possess the

following characteristics:

- Self motivation, self-discipline
- Skills improved bargaining power
- Family requirements
- Few social contacts beyond work and family

Olson's work verified by Ramsower (1985) study of organizational and behavioral effects

of telecommuting from home. Ramsower's "Best Case Scenario" and "Worst Case

Scenario" described the effect of telecommuting based upon the pros and cons of

working from home. The key in the "Best Case Scenario" was communications, both

socially and work related. Using technology to "stay in touch," the telecommuter retains

a high identification with the work group and a strong feeling of being part of the

supervisor's team (Ramsower 1985). This allows the telecommuter and the supervisor to

perform as well, or better than before. The "Worst Case Scenario" presented the

combination of high employer setup costs and poor communication between the

supervisor and the telecommuter. Visibility within the company for the telecommuter

drops to a very low level and suffers from the "out of sight, out of mind" phenomenon.

The supervisor no longer considers the employee for advancement and coworkers

become strangers (Ramsower 1985). The effect of these two scenarios led Ramsower to

believe that the number of days per week, communications, tasks performed and personal

characteristics all play an important role in determining the organizational and behavioral

effects of telecommuting. The suggestion that full-time telecommuting produces many negative effects is used today in designing new programs (Ramsower 1985).

There were cases that did not always paint a successful picture of telecommuting and sometimes showed doubt that the gains in productivity were long lasting or whether a true productivity gain was possible. An example of this is the US Army's Prototype Program for Professionals (October, 1980 - March, 1982). The program began in early 1979. It went through a feasibility study and the approval process, with implementation starting October 1980. The prototype was limited to four computer specialists and a supervisor from the Management Information Systems Division. The specialists were allowed to select hours between 3 p.m. and 6 a.m. which did not have to be eight consecutive hours. These employees were required to work on-site every other Friday. The final report began in March 1982 , and covered supervisory control, increased computer use, CPU efficiency rate, cost savings, employee morale, and personal use of government resources. The report showed marked increases in all of the productivity and morale areas. CPU efficiency rate alone jumped to 102% of on-site employees; a 62% increase. However, when an external audit of the program was initiated in March 1983 it was found that the study did not prove a productivity increase[2] , and that the benefits from morale improvement were not quantified; it concluded that the risks of fraud or

---

[2] The measurement of productivity is the amount of output produced per unit of time. In telecommuting the unit of time has been the length of a normal work day (8 hours). The issue is whether telecommuters are working the normal number of hours for days that they telecommute. Some research has show that telecommuters are working longer and taking fewer breaks than their coworkers. Therefore, the productivity being compared may not be based on the same unit of time.

abuse exceeded the potential benefits and recommended that the program be

discontinued. After reviewing both the external and the project final report, the US.

Army's Automated Logistics Management Systems Activity (ALMSA) concluded that

homework (telecommuting) programs can provide benefits to management and

employees. (NRC 1985)

There are many early studies of different pilot programs. The vast majority of

them show the same conclusion: with the right technology, communications, training,

personnel, and management, telecommuting can be a beneficial management tool for

both the telecommuter and the business.

C. CURRENT RESEARCH AND PROJECTS

Of the current telecommuting projects, the longest running, using a telecommuting

center is the Hawaii Telework Center. This project is sponsored jointly by the Hawaii

State Department of Transportation and private businesses of Hawaii. Started in July

1989, the goal of the project was to test the feasibility and effectiveness of

telecommuting centers as a means of reducing the need for travel. Nine of the seventeen

telecommuters came from seven different state departments; the remaining eight

participants came from the private sector. All of the chosen telecommuters lived in

adjoining communities. Employees working at the center saved as much as eight hours a

week in travel time and experienced less stress associated with commuting in peak hour

traffic. Supervisors found that nearly every employee working at the center had greater

productivity levels than in their prior work environment. The telecommuting program is

still in operation and is a model for research and application of telecommuting. SMS

Research, who evaluated the pilot program, had this to say in the closing paragraph of the

final report:

> The authors of this report have been evaluating public programs since 1974. We have yet to see a program with as much potential as telework centers. Most programs must operate for three to five years before they demonstrate any measurable impact. In its first year, the Hawaii Telework Center Demonstration Project clearly showed that it could be beneficial to employees, supervisors, and employers.

The telecommuters unanimously supported the telecommuting center. Each one

unequivocally stated a preference for Telework Center employment over their prior work

situation. The benefits stated by the supervisors and telecommuters are the same as those

found by Nilles (1976), Schiff (1983), Olson (1983), and Ramsower (1985).

Additionally, the center had an advantage over earlier research in that the variable of

work-from-home was not involved. Negative issues regarding home telecommuting are

various, and range from company liability (e.g., worker compensation) problems to

general distractions of being home (e.g., "I've got a minute — I will start a load of

clothes"). (Hawaii (a) 1991, (b) 1992)

The research done in the 1970's and 80's showing the benefits and successes of

telecommuting, the ever increasing congestion of the highway infrastructure, along with

tougher air quality laws, all set the stage for a renewed interest in telecommuting. An

example is the greater Los Angles area and South Coast Air Quality Management

District's (SCAQMD) Regulation 15. In response to state and federal air quality laws, LA

Basin's South Coast Air Quality Management District (SCAQMD) adopted Regulation XV (Reg 15) in December, 1987. Reg 15's goal is to reduce the number of work-related vehicle trips, thereby reducing vehicle emissions. Ventura County has adopted a similar trip reduction rule, Rule 210. Reg 15 requires employers who employ 100 or more persons at a site, to reduce the number of single-occupancy vehicles arriving at the work site between 6:00 a.m. and 10:00 a.m., Monday through Friday. Rule 210 affects sites with 50 or more employees in Ventura County. Employers must achieve this reduction by developing and implementing trip reduction plans. These plans must be approved by the air districts as capable of reaching the average vehicle ridership (AVR) goal. These goals are set as area targets, and vary from 1.75 to 1.3 (basically three employees for each two vehicles). Companies in support of Reg 15, quickly came up with plans to improve the commute through the use of car pools, van pools, compressed work weeks, and subsidized public transportation. (SCAQMD 1991 p. 1501-1,2)

The State of California started investigating and planning for telecommuting in 1985, and by 1987 had started choosing departments and agencies to be part of their pilot program. The training of supervisors and future telecommuters was conducted in January and May of 1988. The project ran until January 1990 with JALA Associates (Jack Nilles) evaluating the program. About 150 telecommuters were included in the project representing 6 of the 14 participating state agencies. The main difference between this program and the Hawaii program is that California did not demonstrate a telecommuting center; all of the telecommuting was done in the home. The results from California were

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not as dramatic as Hawaii, but it too was a very successful program. (JALA (a)1990 p. 1-10)

State governments were not the only people to see the need for more flexible work arrangements. The federal government, following the ideas of Frank Schiff, started the "flexiplace" program in 1990 to offset suburban sprawl, traffic gridlock, and to find ways to reduce costs and increase efficiency. The program started as a test pilot of the telecommuting concept in federal agencies to see if the government could benefit from the arrangements. While there are many successes in flexiplace, the participation in the flexiplace pilot has been disappointing. The Office of Personnel Management (OPM) had expected up to 1,000 participants by January 1991, but by June 1991, only about 350 employees at about a dozen agencies had signed up for the pilot (US. Merit Systems Protection Board, 1991, p. 50). The flexiplace program is now starting its third year, and while the numbers are still not up to the OPM goals the program is expanding to include federal satellite work sites for telecommuting (Quindlen, 1992).

As more research was completed, the question of whether or not telecommuting would work changed to "how well will telecommuting work for our organization (Farley 1992)?"

In the case of the Puget Sound Telecommuting Demonstration (PSTD) the founders already knew that telecommuting was a successful concept and had used it on a limited basis before the start of the project. The project was designed to educate and bring more businesses into telecommuting and its goals were defined as follows: (Washington (a) 1992)

- Demonstrate telecommuting to a diverse group of organizations in the Puget Sound region by designing, organizing, and managing a telecommuting research project.
- Research and evaluate the impacts of telecommuting on the environment and energy use in the Puget Sound region.
- Research and evaluate the impact of telecommuting on employees and their families.
- Research and evaluate the impact of telecommuting on organizations.
- Assess the potential for telecommuting region-wide and develop policy recommendations based on the findings of this study.

This project was a research project managed by the Washington State Energy Office (WSEO) over a 17 month period — October 1990 to February 1992 — with the Washington State Telework Center (TWC) operating from January 1991 to January 1992. The project had 25 public and private organizations and about 250 telecommuters, their supervisors, coworkers, and a comparison group. The conclusions of the pilot were that it was successful, and reaffirmed some earlier findings of productivity, morale, energy savings, and pollution reduction. PSTD did what it set out to do: it demonstrated telecommuting to a diverse group of organizations in the Puget Sound region and answered questions about telecommuting's impacts. However, it also raised some very important questions: (Washington (a) 1992)

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- What is the long term impact of telecommuting on organizations?
- What is the long term potential for telecommuting?
- What are the potential net regional impacts of full-scale telecommuting on traffic congestion, air quality, and energy consumption?
- What are the long term effects of telecommuting on land use and mobility?

The PSTD was successful, however, the question not addressed or answered is what happens to telecommuting when a company has to pay full price for all the additional expenses of telecommuting for each of the employees that wants to telecommute? All of the current major telecommuting projects have had some type of outside support. In Hawaii and California the state government paid most of the expense as did Washington State in PSTD. In contrast, the Ballard Neighborhood Telework Center, has been open for one year and in that time has had only one user. The center, fully equipped with the equipment needed for a service office (phones, computers, software, furniture, and staff) is priced $200 a month less than an equivalent executive suite with the same equipment. Still, this facility is *not being used* even though the Ballard Center is located in Seattle within a few miles of the PSTD Center that was so successful. (Niles 1992)

D. CONCLUSION

In the twenty year history of telecommuting in the United States, research has shown that if properly planned, telecommuting is successful.

Nilles (1990) shows a number of benefits of successful telecommuting; benefits for both the employers and employees. These benefits include: (JALA (b) 1990)

- Significantly increased productivity (10 to 20% on average)

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- Reduced turnover rates (and related reductions in new employee search and training costs—figure at least $20,000 per employee replaced)
- Reduced office space requirements
- Lower housing costs
- More effective management
- Increased organizational flexibility
- Faster response times
- Increased employee morale

With all the research conducted finding similar results, and with all the known benefits of telecommuting, why are not more organizations telecommuting? Why are all the telecommuting consultants requiring organizations to do a pilot program before starting a full scale program? With all the cost benefits listed above, why will companies not pay — up to the marginal benefit — for telecommuting services? These question all need further research to answer. One explanation is suggested by research described above. Both researchers, and telecommuting consultants, find the major source of opposition to be resistance of managers to the idea of workers off-site, due to the decrease in their direct management control. These issues are summarized below:

- Loss of Control
- Managing remote employees
- Inadequate facilities / Technology
- Communications
- Productivity
- Impact on customers
- Legal issues/union restriction
- Selection of employees

The next section of this report is a case study of the development of a telecommuting program and the Telecommuting Center through which it was implemented. This case will provide a real life example for comparison and analysis of the implementation of telecommuting.

III. CASE STUDY:

THE CALCOMP TELECOMMUTING PROGRAM

A. BACKGROUND

Los Angeles is the second most populous city in the United States. Metropolitan Los Angeles , with a population of 8,863,164 (1990 census), stretches eastward from the coast for about 100 miles to the San Gabriel Mountains. It includes Long Beach, Pasadena, Riverside, Anaheim, Santa Monica, Beverly Hills, and approximately 100 other independent cities (Grolier 1992). This area contains scattered industrial parks, shopping centers, motion picture lots, tract housing, petroleum tank farms, and one of the largest completely artificial harbors in the world. The parts of the LA Basin are joined together by freeways. Because of the vastness of the area public transportation is poorly developed , and therefore, the private automobile is almost the sole means of mobility.

Since LA's beginnings, it has been the center of business and industry for California. As LA grew and developed, congestion and traffic problems also grew and became more complicated. The traditional wisdom, up until the 1980's, was to build more freeways to correct the problem. However, more and newer freeways brought more people, more business, and therefore more traffic and air pollution. These problems were not unique to the LA Basin, but the basin came to exemplify, for the country, how severe the problems could become. Companies came up with plans to improve the commute

through the use of car pools, van pools, compressed work weeks, and subsidized public transportation. Parallel to this effort was the development of telecommuting as a method of trip reduction. (Nilles 1976, Ramsower 1983, Gordon 1986)

B. CALCOMP

1. CalComp's Background

CalComp was established in 1958 by the co-founders — Lester Kilpatrick, Gene Seid, Ron Cone, and Bob Morton — to develop computer systems. In 1959, the then California Computer Products Inc., produced their first product — the model 565 drum plotter — used to log data for missile tracking. This was the world's first drum plotter and CalComp would become known as the plotter people. CalComp has continued their growth in the computer peripherals industry with expansion into the digitizers (1980) and display systems (1982). In 1991 CalComp reached the $500 million mark in total sales. The six groups that constitute CalComp today illustrate diversity of products and geographical diffusion. CalComp headquarters is located in Anaheim, California, along with the Computer Graphics Group, which manufactures pen, electrostatic, and direct imaging plotters, thermal transfer printers, and a full line of graphics supplies. In Scottsdale, Arizona, the Digitizer Products Group manufactures and provides sales and support functions for graphics tablets. The Electronics Manufacturing Group (formerly Display Products), located in Hudson, New Hampshire, produces graphics systems for a variety of applications and also provides electronics manufacturing and design services. (CalComp (b) 1992, CalComp 1990)

The CalComp facilities at Anaheim will be the focus of this case study. These facilities have approximately 900 permanent full-time employees and approximately one hundred temporary employees. CalComp's movement toward telecommuting is the direct result of Regulation XV (Reg 15) of the South Coast Air Quality Management District (SCAQMD). Reg 15 requires that employers of 100 or more employees in the South Coast Air Basin have formal plans to increase the "average vehicle ridership" to target levels during the 6 am to 10 am commute hours. CalComp's target is 1.5 employees per vehicle. The employees that telecommute are counted toward the total employees working for a given day, however for AVR calculations telecommuting counts the same as walking to work. The options which involve no use of motor vehicles are the ones which produce the greatest strides toward the 1.5 goal. Telecommuting is a natural choice, and one popular with employees. (Downey 1992)

2. CalComp's Management
a. Background

The management style at CalComp reflects a flexible and highly participatory total quality management organization. Their style has been developing since the early 1960's and is earmarked by change (Sundquist, 1993). CalComp's beginning was in a new market and they were the world's only manufacturer of drum plotters. As the technology spread and more companies entered the field of plotters, CalComp, by the early 80's, began to lose market share and was following competitors to the market with new products. With key competitors lowering their operating and production costs, CalComp management knew that without a change the company would

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not survive. The company then started the transition to World Class Manufacturing and by 1988 had reorganized into business units and become much more stable in part as a result of developing their own CalComp management model. (CalComp (c) 1992)

b. Management Model

The CalComp management model is a shift to a new manufacturing paradigm. It includes World Class Manufacturing, Concurrent Engineering, Just-In-Time (JIT) inventory systems, and at the heart of all CalComp management practice is Total Quality Management (TQM). From CalComp's TEAM 90 Manual, Figure 1 (p. 31) shows the relationships of all the parts of the model. (CalComp (d) p. 3-4). The outer ring of Figure 1 is the International Standards Organization's standard 9000 (ISO 9000). ISO 9000 is four separate documents (ISO 9001 — ISO 9004) prepared by more than 90 countries of the International Organization for Standardization. It addresses the issue of setting up and implementing a management system that produces consistent products at a particular level of quality. The aim of the 9000 standard was summarized by Davis from the Quality management group at Coopers & Lybrand Deloitte, as follows (Beckerdite 1992 p. 6-7):

- to increase customer confidence in the company, by providing a common framework across Europe (and the world)
- to move from a system of inspection to one of quality management
- to remove the need for multiple assessments of suppliers
- to gain management commitment; to link quality to cost effectiveness
- to give customers what they have asked for

The three parts of the inner ring (Figure 1) of World Class Manufacturing (WCM), Concurrent Engineering (TEAM 90), and Business System Excellence (BSE) are the tools that Calcomp uses to be a successful ISO 9000 company.

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RELATIONSHIP OF ISO 9000
TO CGG CONTINUOUS IMPROVEMENT
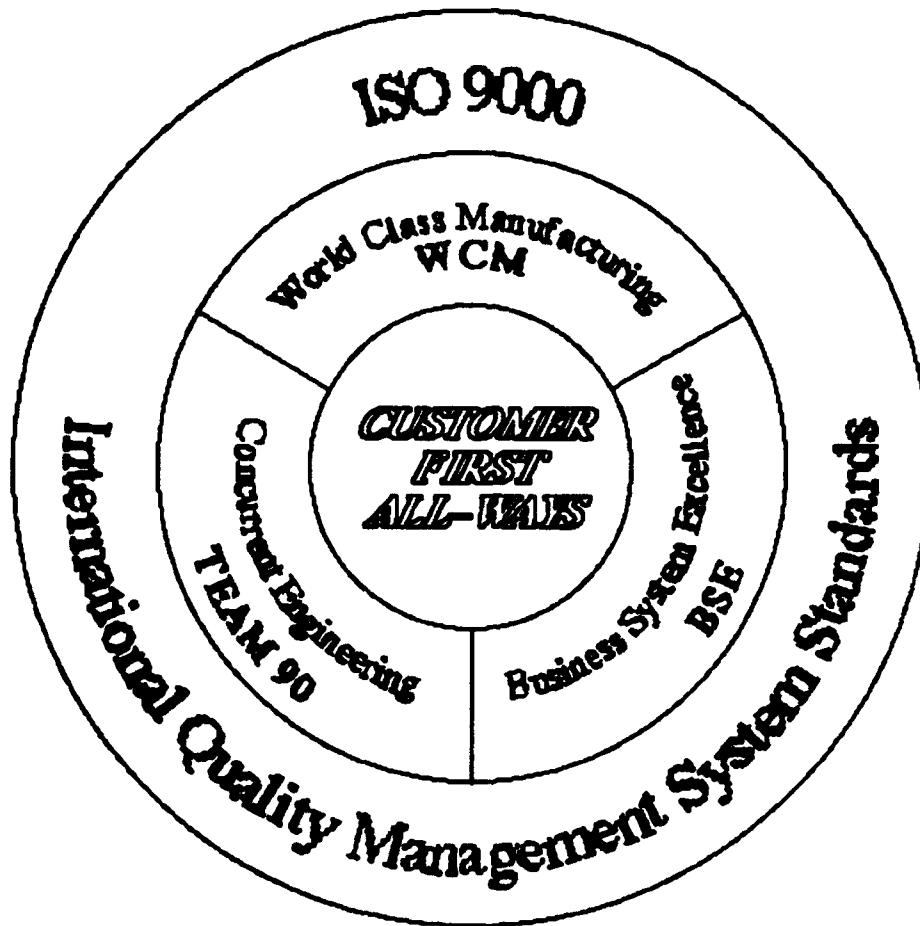
Figure 1 CalComp's Management model
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As a World Class Manufacturer, CalComp must be prepared to excel simultaneously in

many ways, including the following: (NAC p. 28)

- ◆ Lowest cost
- ◆ Highest quality
- ◆ Greatest dependability and flexibility
- ◆ Best service
- ◆ Fastest response to customer demands

CalComp's management has developed these using Concurrent Engineering and the systems approach to their general business practices. Concurrent Engineering is a systematic approach to the integrated, simultaneous design of both products and their related processes, including manufacturing, test, and support (Turino 1992 p. 8). Using these practices while keeping Total Quality Management (TQM) at the heart of all Calcomp management is CalComp's goal. The CalComp TQM driver, *CUSTOMER FIRST ALL-WAYS*, is the satisfaction of every customer whether internal or external (CalComp (c) p. 5).

3. CalComp's Telecommuting Program
a. Background

In compliance with SCAQMD Reg XV, CalComp is required to submit a two-year traffic reduction plan to the district. This plan is to show how CalComp is going to obtain the goal of an AVR of 1.5 and must be approved by the district's review board. The penalty of not submitting or not getting the plan approved is $25,000 a day until approval. Jack Downey, CalComp's Ride Share Coordinator, is responsible for developing and submitting the plan for CalComp. CalComp's 1992 plan had been rejected twice when by the district's review board Jack Downey toured the Telecommuting Workcenter Of Riverside County (TWRC). CalComp had already used telecommuting on a limited informal basis for project work at home. However, CalComp felt that it was not a management option for the whole company. Downey, with the help of the TWRC staff and Pacific Bell' s telecommuting manager, developed a

telecommuting pilot program using the center. With the addition of this program and updating the programs for ride sharing, CalComp's plan was approved.

On May 15, 1992 CalComp implemented a pilot telecommuting program to a limited number (maximum 15) of qualified Anaheim employees. The initial term of the pilot program was three months. Under this program, the telecommuter would work up to two days per week at the TWRC. CalComp defined telecommuting as the process of working at a remote site and using telecommunications to stay in contact with the central office (Satellite office and/or Neighbor Work Center concept) and set forth policy guidelines. (Appendix B) CalComp's stated policy is as follows:

> Through the Pilot Telecommuting Program, CalComp seeks to provide an alternative to working every day in the central office location. Telecommuting is the process of working at a remote site and using telecommunications to stay in contact with the central office. Expected results will be improved employee productivity and personal job satisfaction in addition to contributing to the attainment of the Average Vehicle Ridership Goals mandated by the south Coast Air Quality Management District. CalComp recognizes that telecommuting may be a viable option for its employees and will use the Pilot Telecommuting Program to evaluate the benefits to CalComp and its employees.

b. Employee Selection

Mr. Downey presented the new pilot program to CalComp's management and in turn asked managers to seek volunteers who lived in the center area as defined by local postal zip codes. The volunteers were screened by their managers according to the type of work performed and by their Zip code. According to the interviews conducted at CalComp all of the pilot program participants were known to be strong performers professionally (Downey 1992). CalComp's program started with six employees all within

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a short time commute to the Telecommuting WorkCenter of Riverside Country

(TWRC). The employees were allowed to start with one day a week at the center and the

remainder at the normal work place.

c. Training and Evaluation

The program began with the a tour and briefing by the TWRC staff and

introduction to the rules for use of the center. The center (discussed later this chapter) is a

test project based on California's Telecommuting Pilot Project of 1990 and as such would

require all telecommuters to answer surveys and to track driving time for the project

evaluation. No further training was offered to the pilot group.

d. Equipment and Technical Requirements

CalComp supplied the required office equipment to set up three computer

work stations, each with telephone lines for voice and data transmission. The computers

were IBM® clone Intel® 80386 machines with a 9600 bit per second modem and a shared

printer. This configuration allows for fifteen employees (three per day) a week to use the

center. The computer equipment used was leased to fulfill the requirements of the pilot

program without requiring any company fixed assets. The recommendation of the

Information Systems Department was to install the workstations in a local area network

(LAN) with a leased line for connection with the company's LAN backbone. This type of

arrangement would give access to all company data systems. However, this option was

deferred until the completion of the pilot program. Connectivity to CalComp for data

transfer was through the use of CompuServe, a commercial network.

4. Pilot Program Continuation and Future Plans

The initial term of the pilot program was three months. The program has been extended indefinitely, but the program for company-wide expansion has been placed on hold while the company goes though some organizational changes. Currently CalComp has 6 telecommuters working at the center one day a week. The company has removed the leased equipment, and replaced it with company owned equipment and the program expansion should begin upon completion of the LAN installation at the center. CalComp is also looking into the possible expansion into new telecommuting centers as they become available in CalComp's area, as well as reevaluating the work at home option. (Downey 1993, Sundquist 1993, CalComp (a) 1992)

C. TELECOMMUTING WORKCENTER OF RIVERSIDE COUNTY

1. Telecommuting Workcenter's Background

In 1990 and 1991, Assemblyman Steve Clute (D-Riverside) introduced bills AB3069 (Chapter 628, Statutes 1990) and AB1065 (Chapter 1651, Statues 1991) to establish a Telecommuting Pilot Project. The intent was to "conduct a one-year pilot project utilizing the process of telecommuting as an alternative to commuting between home and work for employees in private industry." The goal of the legislation, and that of the pilot project, is not to test telecommuting — it is to develop telecommuting centers as a work place of the future (Morton 1992, California State Assembly 1990).

The enabling legislation provided $100,000 in state funding if matched equally by the Riverside County Transportation Commission (RCTC) and the private sector. This would give the center a minimum of $300,000 for the first year of operation

(Economic Development Partnership 19⌐2). This private sector funding was defined as "cash or in-kind contributions which could include, but was not limited to, office space, office furniture and supplies, and computer and other equipment" (California State Assembly 1990).

Pacific Bell, a leader in the development of home-based telecommuting programs, stepped forward with a $50,000 cash contribution to support the project. With this support, others quickly filled the remaining requirements. (see Appendix C for a complete list of supporters)

The Telecommuting Workcenter of Riverside County was designed as a neighborhood workcenter. It is located at a facility designed for this specific use in the city of Riverside, California. Part of the program is an evaluation of the physical needs of the telecommuting facility. In planning for the development of the telecommuting center, certain facility targets were set. The Workcenter has met the following requirements:

- office/business park zoning
- approximately 8,000 square feet
- 20 private offices and modular work stations that will combine to accommodate approximately 55 plus employees of numerous corporate occupants
- tenant improvements that include some standardized work stations and some spaces customized to the needs of an employer
- common areas and equipment that includes center management, telefax, copy, and other office machinery, conference and work rooms

Convenience to the commuters was the primary reason for choosing the center's location. The center is central to a large residential population (i.e., Riverside, Moreno Valley, Corona, and Woodcrest areas) and adjacent to the 91 (Riverside) and 60/I-215 (Pomona) Freeways. (Morton 1992, Economic Development Partnership 1992)

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2. Telecommuting Workcenter Operations

The operation of the workcenter is no different than any normal office place. There is a security door, a receptionist, and all of the normal furniture items that are required in everyday in business. The center has normal operating hours during which the staff is on site, and a key system for after-hours use of the center. What is different is that the people who work here are from different companies and are not part of the same corporate group. The operation of the center could be compared with that of an executive suite. When asked to compare a telecommuting center to a executive suite, Ward (Director of Telecommuting, Economic Development Partnership, Inc.) had this to say:

> when you go on an airplane there are two sections aren't there. They both get you to your destination. The only difference is the price and the service that it buys. Executive Suites answer your phone we don't. . . . we are aimed at the workers and the companies that can not invest the capital required to have *their own centers.* . . .(Ward 1992)

TWRC provides a secure location and all the basic office requirements for employees from different companies to work remotely. All that is required is for the companies to add the technology necessary to their workers. Some centers have been developed with computer hardware and software in place and this works well for entry into the center at a low cost for pilot programs, but substantially increases initial operating cost for the center. TWRC allows the companies to customize to fit the organization. The "virtual office work station" only reaches a fully functional level when the space is customized by the organization.

Realizing that the one year demonstration period was too short a time frame, to determine the potential role telecommuting work centers could play as a business and/or trip reduction strategy, the TWRC has secured funding for a second year of operation. The two major founders are:

* Riverside County Transportation Commission, $100,000 (Measure A).
* State of California, $150,000 (Petroleum Escrow w Violation Account).

In addition, $75,000 has been granted to the WorkCenter by the California Department of Transportation specifically for marketing. Geographic, a marketing company, has been hired through this funding to assist in the development and implementation of a marketing plan. The marketing effort will be a central feature of the WorkCenter's attempt to secure additional tenants. The Economic Development Partnership, Inc. submitted a grant proposal to the South Coast Air Quality Management District under the AB 2766 (Mobil Source Air Pollution Reduction Review Committee) funding process. Funds in the amount of $60,000 have been awarded to add video teleconferencing equipment to the WorkCenter. This new amenity will enhance the profile of the WorkCenter and potentially lead employers to more readily embrace alternative work strategies as effective business tools. (Economic Development Partnership, Inc. 1992)

D. CASE FINDINGS

1. Introduction

The findings in this case study were simple. CalComp, when first considering

telecommuting, faced many of the same issues that had been so well documented in

projects / studies and in telecommuting literature (described in Chapter II sections B and

C). As CalComp progressed through the decision process and development of their

program, many issues that had been deterrents to implementation of telecommuting were

greatly reduced or removed altogether. CalComp was one of four companies using

TWRC and was chosen for this case study based on interviews with the Rideshare

Coordinators of each of the four companies. These in-person, one-on-one interviews

were meant to determine how close to implementation each company was, and the

availability of personnel for interviews. Some of the other companies had larger

programs; however, CalComp was chosen for this study because it was at the starting

point of a new program that could be followed throughout implementation. The next

sections will review the research findings derived from the literature and compare them

with the case study findings of CalComp with specific examples from interviews at

CalComp.

2. Issues
a. Background

The issues presented by the research generally fall into two categories (a)

management (b) employees. A third category has been added to the discussion below that

examines the issues addressed by the telecommuting center. The management issues are a

mix of both company policy, and personnel manager problems, with implementing a telecommuting program (e.g., what is the corporate culture, how flexible are the organizational rules of the company, and how the mangers manage their personnel). The employee issues concern employee-supervisor relations, productivity, and quality of life. The issues of telecommuting centers involve the overlap of management and employee issues that impact work away from the normal work place.

b. General Management Issues

As the first step in the case study, interviews were conducted to find the issues that concerned CalComp before implementation. The issues found were very similar to those mentioned in the research literature and published recommendations from telecommuting consultants. Reviewing the past projects and research (Chapter II), the issues that general managers face in considering a telecommuting program fall into the following general areas: (NRC 1985, Schiff 1983, Olson 1985, Ramsower 1985, Hawaii (a) 1991, (b) 1992, JALA (a)1990, Washington (a) 1992)

- Loss of control
- Managing remote employees
- Inadequate facilities / technology
- Communications
- Productivity
- Impact on customers
- Legal issues/union restriction
- Selection of employees

Table 1 summarizes the impact of these issues in four groups; (1) Early studies — from the Blue Cross / Blue Shield program to the Hawaii Telecommuting Center (2) Current Projects — Hawaii Telecommuting Center through the Washington State Energy Office Demonstration (3) CalComp before considering TWRC (4) CalComp after considering

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TWRC but before implementation of telecommuting. The table indicates whether the issue was viewed as having a (1) HIGH (2) MODERATE or (3) LOW impact on how the managers rated the issue as a problem or deterrent to telecommuting.

Summary Of Management Issues				
Projects Issues	Early Projects	Current Projects	Calcomp	Calcomp With Twrc
Loss Of Control	High	High	Moderate	Low
Management Of Remote Employees	High	High	Moderate	Low
Inadequate Facilities / Technology	High	High	Moderate	Low
Communication	High	High	Moderate	Low
Productivity	High	High	High	Low
Impact On Customers	High	High	High	Low
Legal Issues	High	High	High	Low
Selection Of Employees	High	High	Moderate	Low

TABLE 1 SUMMARY OF MANAGEMENT ISSUES

c. CalComp Management Issues

The immediate response by CalComp's management appears to be identical to many of the programs discussed earlier in this thesis. One of CalComp's managers put it this way:

... from a management standpoint I was very open to doing it (telecommuting). The hesitation was: How do you manage remote people? How do you know what people are doing? How do you know if they are working if you can't see them?

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However, when closely examining CalComp a difference develops: CalComp's

Management Model. The strategic focus for CalComp is the customer first all-ways

heart of their TQM/ISO 9000 model. This focus and approach to change allowed

CalComp to evaluate each issue and eliminate or greatly reduce the concern.

(1) Loss of Control and Management of Remote Employees. To CalComp

the major goal was to make the employee workplace transparent to the customer.

Without control and proper management, CalComp saw a threat to their customer service

record, and therefore the issue had to be addressed. CalComp's top management reviewed

their current control and management system and determined that in a proper business

environment nothing at CalComp would change.

> . . . Even if we (CalComp) had 25% of its workforce telecommuting, I see
> nothing that would change. The concern here is for our customers and service to
> them. This is a very competitive business and a change to make service better
> should always be explored.

However, when CalComp's top management first considered the telecommuting concept,

they identified several concerns about employees working from home. According to

CalComp "home" carries its own set of distractions as well as limitations in the available

hardware, software and normal business services. The facilities at TWRC fulfilled the

needs and concerns of this area.

(2) Inadequate Facilities / Technology. When the option of TWRC was

added, CalComp's management concerns over management issues were reduced to a

level that now made telecommuting possible. The telecommuting center includes

company owned and controlled computers and software. It has the necessary services,

such as copy and fax capabilities. But, perhaps most importantly, it provides a quiet, office-like environment, free of the distractions encountered in either the home or normal office setting. As a CalComp manager put it:

> If the nature of the work assignment is such that close personal contact with fellow workers or access to office files isn't necessary this should be the most productive of all office environments. . .We at CalComp feel that, if the telecommuters are properly selected, telecommuting will not cause any change in management control.

(3) Communications. CalComp has five different types of telephone service for its customers and the concern in this area was again customer service. This was quickly answered by the Voice Communications Department and with help of Pacific Bell all voice services, with the one exception of the 800 order line, were made available at the center. These services included: call forwarding, voice mail box service (some of the telecommuters have both voice mail with the CalComp switchboard and PacBell), and E-Mail. Additionally, CalComp management was concerned that the informal communication between employees would stop and the telecommuters would be left out of the interoffice network. This issue was also quickly overcome by the pilot program limitation of only telecommuting one day a week.

(4) Productivity. In this research the productivity issue has been a concern of all of the companies that considered telecommuting as a option. CalComp was no different. The concern at CalComp was that the telecommuter would not understand what work could and could not be done remotely and therefore not have the right things with them to complete their work. Additionally, the concern of working at home came up

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again as a deterrent to productive work. TWRC again was the answer; that with a private office at the center, general items for the telecommuter should be staged, and the center would serve as a office environment for the employees.

(5) Impact on Customers. The impact on customers issue was a combination of all the other concerns. Whether it be communications or control, CalComp did not want the customer to see any negative change. As the other issues and concerns were cleared, the concern with the customer view also became less of an issue. As CalComp's management put it "TWRC was the answer. . . .services at the center are truly transparent to the customer."

(6) Legal Issues. CalComp's review of the legal issues included issues of workers compensation, benefits, and union restrictions. The major concern in this area was that there is no precedence set in court on the issue of workers compensation while working from the home (Sundquist 1993).

> . . . what if a telecommuter, while working at home. takes a break and in going to the kitchen trips and breaks an arm. Who is responsible? Is this a "home" accident or is this a worker accident? Does worker's comp cover this? . . . The center (TWRC) is clearly a work place in all areas and can be covered that way.

CalComp, with the aid of the legal department and their insurance company, determined that the center was clear on all of the issues and that telecommuters could be covered, at all times at the center, with the same coverage as the home office in Anaheim.

(7) Selection of Employees. While there are some employees who would be able to telecommute from home effectively, CalComp felt that this type of telecommuting would pose problems for the vast majority of employees because of the

normal dirtractions of home and the problems of having the right technology. TWRC

opened the possibility of a telecommuting option to many more employees. All

telecommuters were volunteers who had been approved by their area supervisor.

As the program matured, further interviews conducted with the line managers

of the telecommuters determined that the only remaining issues were the issues of

technology and training. All other issues normally found in telecommuting had been

resolved or were no longer considered problematic. (Downey 1993, Sundquist 1993,

CalComp (a) 1992)

d. Employee Issues

Further interviews with the telecommuting employees showed the same

departure from the literature. The CalComp employee issues followed the same basic

pattern: the concerns voiced before implementation were not found after the initial phase

of the program. Past projects and research have found that the issues affecting

telecommuting employees generally fall into the following categories: (NRC 1985,

Schiff 1983, Olson 1985, Ramsower 1985, Hawaii (a) 1991, (b) 1992, JALA (a)1990,

Washington (a) 1992)

- ◆ Isolation
- ◆ Productivity
- ◆ Technology
- ◆ Location
- ◆ Number of days telecommuting

Table 2 summarizes the impact of these issues using the same divisions as

above; (1) Early studies — from the Blue Cross / Blue Shield program to the Hawaii

Telecommuting Center (2) Current Projects — Hawaii Telecommuting Center through

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the Washington State Energy Office Demonstration (3) CalComp before considering

TWRC (4) CalComp after considering TWRC but before implementation of

telecommuting. The table indicates whether the issue was viewed as having a(1) HIGH

(2) MODERATE or (3) LOW impact.

e. CalComp's Telecommuting Issues

In general, employee participants feel that telecommuting has no negative

effects on their routine jobs. The issues and concerns found in most telecommuting

literature, and with CalComp management initially, were not found with CalComp's

telecommuters. The telecommuters feel that they are:

- From 20 to 100% more productive than at the normal work place
- In close contact with both their supervisors and coworkers
- A part of their corporate culture

However, the telecommuters all voiced concerns regarding the following issues. These

issues are technology, training, location, and number of days telecommuting.

Summary Of Employee Issues				
Projects Issues	**Early Projects**	**Current Projects**	**Calcomp**	**Calcomp With Twrc**
Isolation	High	High	Low	Low
Productivity	High	High	Low	Low
Technology	Low	Low	Moderate	High
Location	Low	Low	High	Moderate
Number Of Days Telecommuting	Low	Moderate	High	Moderate

TABLE 2   SUMMARY OF EMPLOYEE ISSUES

(1) Isolation and Productivity. The concerns of isolation and productivity never were issues with CalComp telecommuters. The telecommuters at CalComp felt that they were a part of everything that went on at CalComp. The only concern was voiced this way:

> . . . if we (CalComp) increased telecommuting to everyone, it would make scheduling a birthday party for someone pretty hard . . . but there would still be days that everyone would be in the office. . . .

Productivity was viewed similarly; all felt even before the program began that they (telecommuters) would be just as productive, if not more so than at the office. As one telecommuter said ". . . if all that we get back from telecommuting is that one hour that it takes to get over the morning commute we'll all be one hour more productive. . . ."

(2) Technology. The technology issue is the inability to log into the CalComp LAN system. This limits the type of work that the telecommuter can complete at the center. This shortcoming requires help from personnel at the office, or means that a job has to be completed on the next day at the normal office. One telecommuter found this to be so restrictive that the number of days telecommuting were reduced to only days that system work would not be required. This issue is closely tied to the issue of where the telecommuter works. With the increase of PCs in the home with high speed fax / modems and laser printers the requirement of using a center could change.

(3) Location. Location is a split issue; some of the telecommuters feel that if the center limits them to what can be done on a PC and over the phone, then why use the center, why not work from home? The other group, however, feels that it is very

important to get away from the home environment to be productive. Interviews with telecommuters showed that each case was different, and each had a different view of "homework". They all felt that a more flexible program would increase the number of telecommuters.

(4) Number of Days Telecommuting. All CalComp telecommuters were telecommuting one day a week, at the time of this study. However, all reported that, if given the opportunity, they would telecommute up to three days a week, and that the only impact on CalComp would be better service to the customer and higher productivity.

(5) Training. Training is an issue that was not apparent in much of the research and writings on early pilot programs. However, all of the employees agreed that new telecommuters needed additional training to ease the transition from working at a desk at CalComp to working at the center. This problem relates to the earlier technology problem; the current training provided does not focus on how to connect to the home office at CalComp in Anaheim, but is only on how to use the facilities at the center. The required software to work remotely is new to most of the telecommuters, and the time required to learn to use the system could be reduced by proper training.

f. Telecommuting Workcenter Issues

The founders of the telecommuting center named four issues that they felt should make telecommuting increasingly attractive to local businesses and government agencies. They were:

- To reduce vehicle trips and vehicle miles traveled
- To provide a work place alternative that permits employees (telecommuters) to work close to their place of residence

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- To demonstrate the benefits of moving the work to the worker, instead of the people to the work
- To assist employers in complying with Regulation XV requirements

However, these issues are not truly issues of a center, they are more the issues of the concept of telecommuting, and developing a regional telecommuting program. (Economic Development Partnership 1992, Gordon 1986, Ursula 1990, Washington (b) 1992)

The companies using the center saw a different set of issues for the center. They saw the center as providing a solution to problems related to home telecommuting. Home telecommuting issues are various and range from company liability (e.g., Worker's Comp) problems to general distractions of just being home (e.g., " I need a break, I'll just run down to the store to get a few things"). Each company could have addressed these issues by opening a satellite office, but, this would have been very expensive and have caused each company to develop offices for small populations of employees. The telecommuting center provides the office requirements at such a low cost that many companies can use and customize them to suit their needs.

3. Discussion of Case Study Findings

The issues discussed above started out the same for CalComp as for other telecommuting programs, but quickly migrated to a much smaller set of issues. CalComp, through its normal decision making process and systems approach (discussed in the next chapter), systematically removed the issues to ensure a successful pilot program. CalComp had many success stories to its credit, of how well its program was

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working, along with a few of why it was not working as well as it should. The following are examples of each type.

One of the successes was a telecommuter that was called up for jury duty in the Riverside City Court. The requirements were for the telecommuter to be within 45 minutes of the court, at all times, for a two week period. In the past, CalComp employees called for duty would not be able to work during that period. However, in this case the employee was a telecommuter, and with the center being located in Riverside, the telecommuter was able to work and maintain contact with the customers normally served without disruption. The telecommuter's manager said ". . . instead of losing a valuable employee . . . we never even missed a call." Not all of CalComp's stories were successful.

In contrast, the issue of technology in some cases was not just an inconvenience but a complete inhibitor. One telecommuter who works very closely with customers has to be able to run routines on the workstations and mainframe computer at the CalComp office. The center's equipment was not able to accomplish this type of connection, and coworkers were having to perform parts of the telecommuter's work and then fax the output to the center. This has greatly reduced this telecommuter's ability work remotely. Technology is one of the only issues remaining for CalComp to solve. With most issues resolved, CalComp's concerns are with the new requirements of technology and training. (Morton 1992, Nolan 1992, Downey 1993)

The issues presented in this case and in the earlier research are basically the same, but in the case of CalComp the issues were resolved before the implementation began. In earlier research some of the issues were never fully resolved. While not part of

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the research questions of this thesis, a question arises: how did CalComp resolve these issues when others could not. One possibility is CalComp's *management of change*.

In the next section the issues bought forward in the case study will be presented using change management theory to reflect on how the issues were handled at CalComp. The presentation of telecommuting as a change issue will concentrate on change process and the manager (change agent) implementing the change.

IV. THE CHANGE ISSUE

A. INTRODUCTION

From the first project in the early 70's, to the case study of this thesis, the benefits and issues of telecommuting appear to have remained the same. The benefits of telecommuting are basically the same in each program, with the only difference being the degree to which each benefit was achieved. In addition, the same issues are voiced each time a program is started and are resolved through the use of a pilot program. These issues have mainly proven to be issues of general management and management of distributed workers, and not of telecommuting.

As proposed in the findings of the case study, the reason for varying degrees of successfully institutionalizing telecommuting may be due to the fact that many organizations are not approaching telecommuting as a change issue. Michael Farley of the Washington State Energy Office believes that many of the issues that arise in the implementation of a telecommuting program are existing organizational management issues that are undiscovered, or are covered by crisis management. In Farley's words:

> This (telecommuting) is a change issue, and with that comes all the problems of change. There are no management issues specific to telecommuting, there are only issues of good and bad management. Telecommuting forces a manager to use good management practices and highlights a manager that does not. There are only three issues that are truly come from telecommuting — (a) technology, (b) communications, (c) coworker impact — and these are things that managers work with normally.

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The original research questions of this thesis were:

- What are the management issues of implementation of telecommuting?
- What management issues do telecommuting centers address?
- What effect does a telecommuting center have on these issues?

These issues have been discussed through the literature and are findings reviewed in prior chapters.

All of these questions are interrelated if viewed from a change management perspective. A traditional management organization planning a change will inevitably face resistance to the change; "The reasons that it wouldn't work." The companies in the research literature and in this study that had a compelling reason to change, and a good change management process, had better success than those that did not.

The resistance of companies or government agencies to accept telecommuting, and the resistance to expand programs is well documented. Data from earlier research has many examples: (1) 25% of supervisors in the Washington State project did not want to expand or continue after a very successful demonstration; (2) The federal government program Flexiplace has not reached their goals and been very slow to expand; and (3) The pilot phase of TWRC had ⁓ be expanded to a second year to be able to evaluate the program due to low use of the center. (Washington (b) 1992, U.S. Merit Systems Protection Board 1991, Economic Development Partnership, Inc. 1992).

The sources of resistance appear to be the same at the start of each program. Therefore to analyze the issues of telecommuting and telecommuting centers, the broader issue of change management must be applied. The issues from the case study of CalComp and their handling of the issues will serve as the basis for this presentation. To

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analyze this resistance to change, we must first discuss a model of change, and the model

of the idea manager (change agent) for change.

B. THE CHANGE MODEL

The theoretical model that this report will use to analyze the case study is the

Beckhard-Harris model for managing complex change. This model, as described in

Organizational Transitions Managing Complex Change, involves three distinct

conditions (Figure 1) (Beckhard 1987 p. 30):

- the future state — where the leadership wants the organization to get to
- the present state — where the organization currently is
- the transition state — the set of conditions and activities that the organization must go through to move from the present to the future

Present state   Transition state   Future state
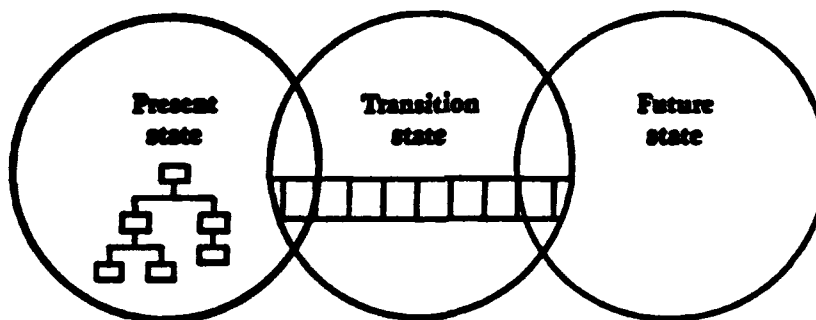
Figure 1. Beckhard-Harris States
Richard Beckhard and Reuben T. Harris, <u>Organization Transitions, Second Edition,</u> Copyright © 1987 Addison-Wesley Publishing Company.
Reprinted by permission.

The first step in the Beckhard-Harris model is to define the need for change.

> Organizational change must start by defining the need for change, for it is this question that provides the initial impetus . . . focus on the issues involved in diagnosing the need for change, determining the degree of choice that exists about whether to change, and identify what needs changing. (Beckhard 1987 p. 30)

An example of that need to change is the greater Los Angeles area (the LA Basin) and their Regulation 15. Reg. 15's goal is to reduce the number of work-related vehicle trips, thereby reducing vehicle emissions. This requires employers who employ 100 or more persons at a site to reduce the number of single-occupancy vehicles arriving at the work site between 6:00 a.m. and 10:00 a.m., Monday through Friday. Employers must achieve this reduction by developing and implementing trip reduction plans. These plans must be approved by the air districts as capable of reaching the average vehicle ridership (AVR) goal. These goals are set as area targets, and vary from 1.75 to 1.3 (basically three employees for each two vehicles) (SCAQMD 1991 p. 1501-1,2). The shift of responsibility to the employer requires a change in the way employers look at the way their employees get to work. Companies in support of Reg. 15, quickly came up with plans to improve the commute through the use of car pools, van pools, compressed work weeks, subsidized public transportation, and telecommuting. (SCAQMD 1991 p.1501-1,2)

Once the need to change has been established the second step in the Beckhard-Harris model is defining the future state:

> . . . the greatest single threat to successful change results from inadequate early attention to defining the desired end states for the change, both the ultimate vision and the interim future state (midpoint goal). (Beckhard 1987 p. 46)

This second step is the hardest of all to define in telecommuting. None of the programs define an end point for telecommuting. Michael Farley of WSEO says that the goal should be a percentage of the work force:

. . . because telecommuting is a tool for management . . . employees who telecommute and how much they can telecommute will always change, but as a goal you should work toward having 12% of employees telecommuting . . . .

Other groups don't differentiate telecommuting from other traffic reduction programs.

Therefore, there is no future state defined for telecommuting alone. They are satisfied

with whatever mix of options (vanpools, carpools, buses, etc. . .) that meets the goals of

the system (e.g. Reg. 15). The trend is to not have an ideal future goal; though many

organizations establish an immediate goal with the limited signs of pilot implementation.

Beckhard-Harris 's third step is assessing the present (benchmarks for change).

Defining the need for change and determining the degree of choice about whether or how to change provide only a partial picture. Prior to making specific choices about change tactics and action plans, an assessment of the present, taking into account the desired future state, must be completed. (Beckhard 1987 p. 57)

All of the companies interviewed and all of the past research literature have found

this phase to be the most time consuming. In light of Reg. 15 and the view most

companies took when developing their future state, the task became one of comparing

official requirements (e.g., ridership) and to actual figures, and then making an

evaluation based on the difference. Evaluating the present is much more than just

reviewing ridership numbers, it is where the company is now and "how the company

does business." Merely assessing the present without knowing the desired future state,

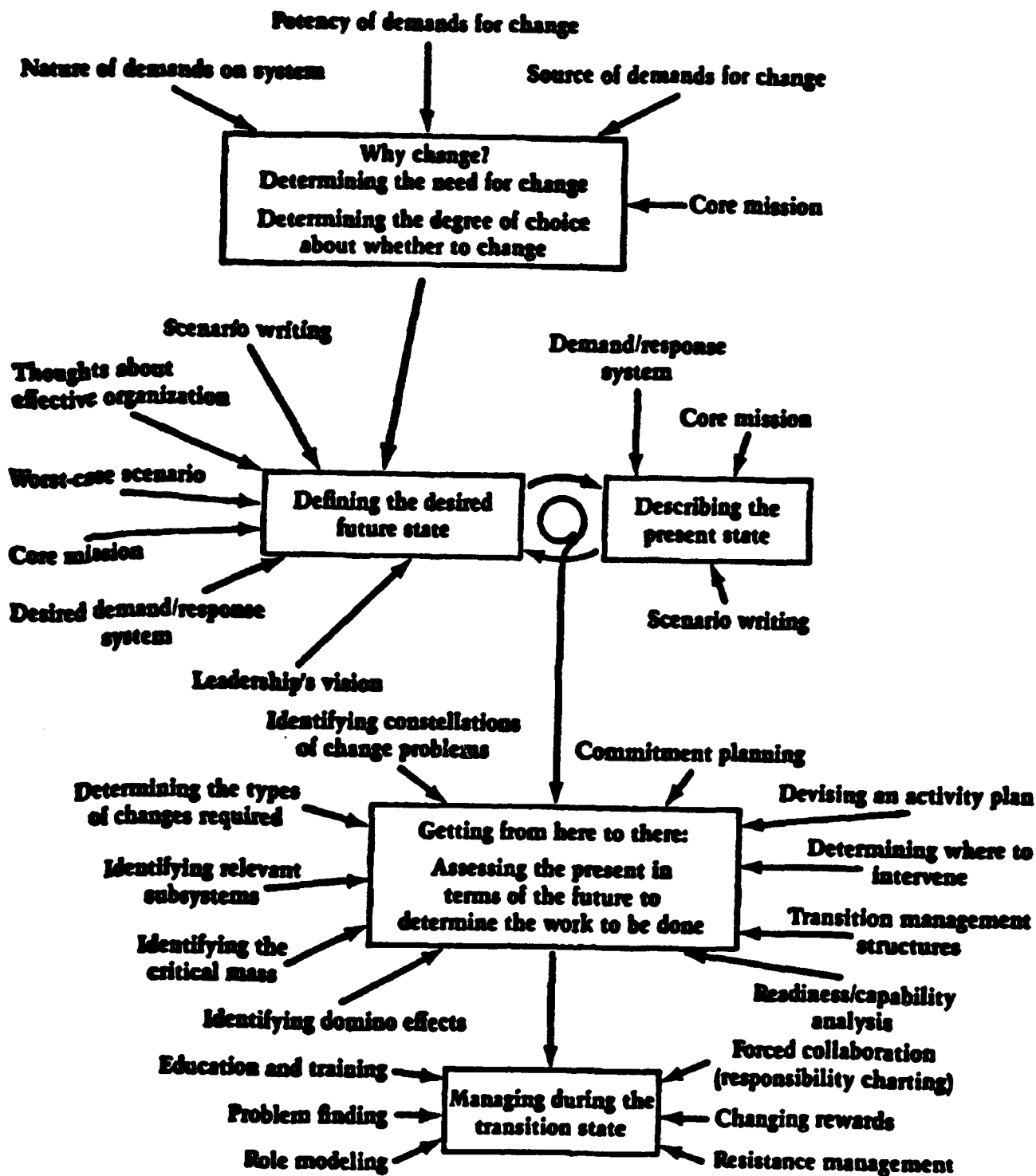and evaluating the operation of the organization does not give a true starting point.

Figure 2. The Change Management Process
Richard Beckhard and Reuben T. Harris, Organization Transitions, Second Edition.
Copyright © 1987 Addison-Wesley Publishing.
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Step four in the theoretical model is transitional management; to develop a plan of action that will take the group from the present to the desired future state. The action required is very flexible and is very different for each situation. This is the period during which the actual changes take place.

> The tasks and activities of the transition state may or may not look like those in the future or present states. In managing the overall change process it is always important to (1) determine the major tasks and activities for the transition period, and (2) determine structures and management mechanisms necessary to accomplish those tasks. (Beckhard 1987 p. 71)

Figure 2 (Beckhard 1987 p. 112) shows how all of the Beckhard-Harris model fits together.

The most important step any change agent should require is the involvement of all the people that the change touches. You must have support of the whole organization from top down to make change work. The Beckhard-Harris Model addresses this in their commitment plan as a requirement to a successful change effort. They described it as follows:

> A *commitment plan* is a strategy, described in a series of action steps, devised to secure the support of those subsystems which are vital to the change effort . . . . (Beckhard 1987 p. 93)

This step of the change management may possibly be the true root of the problems with making telecommuting work. Nolan of Pacific Bell has this to say about commitment:

> . . . you must have complete support top to bottom. . . telecommuting will not work as a grass roots movement . . . the reason is that you are changing the way people do business. You ~ changing the way the entire organization does business. If one person v.∟.ᴋs from home everything else in this organization must change. . . .

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At CalComp the entire organization supports telecommuting. In interviews with telecommuters, telecommuters' managers, and CalComp general management, all voice a similar view: "We support telecommuting at TWRC 100%."

C. THE IDEAL MANAGER FOR CHANGE

The theoretical model that is the most applicable to the changing 90's is Hersey's Situational Leadership Model (Figure 3.) (Hersey 1984 p. 63).

Using Hersey's framework of task behavior and relationship behavior (a model for leadership styles) the change agent will have to use all four styles of leadership. As with any other situation when working with people, the order of events, or styles used may not always be the same, but the principles are always applicable.

First the need for change will come forth as a Style 1 order. This could be a mandate from corporate headquarters or an environmental problem that dictates change. Leadership Style 1 is directive. It consists of telling the individual or group what to do, when, where, how, and with whom to do it. Style 1 is typified by one-way communication in which the leader directs the followers toward accomplishing tasks and reaching goals (Hersey 1984 p. 36-37). Then after the need is shown, management then Shifts to style 2. In this style there is more communication among / with the personnel, and there is still guidance, but at the same time, the leader provides explanations and opportunities for clarification. This is a time of selling the change and getting the follower to buy into the change psychologically (Hersey 1984 p. 64). Once the idea has been explained and personnel have had an opportunity to ask questions, the stage is set to

move into Leadership Style 3. Style 3 is characterized by leader behavior that provides

encouragement, promotes discussion, and asks for contributions from the followers. This

represents a big difference from Styles 1 and 2, where the leader provides the directions

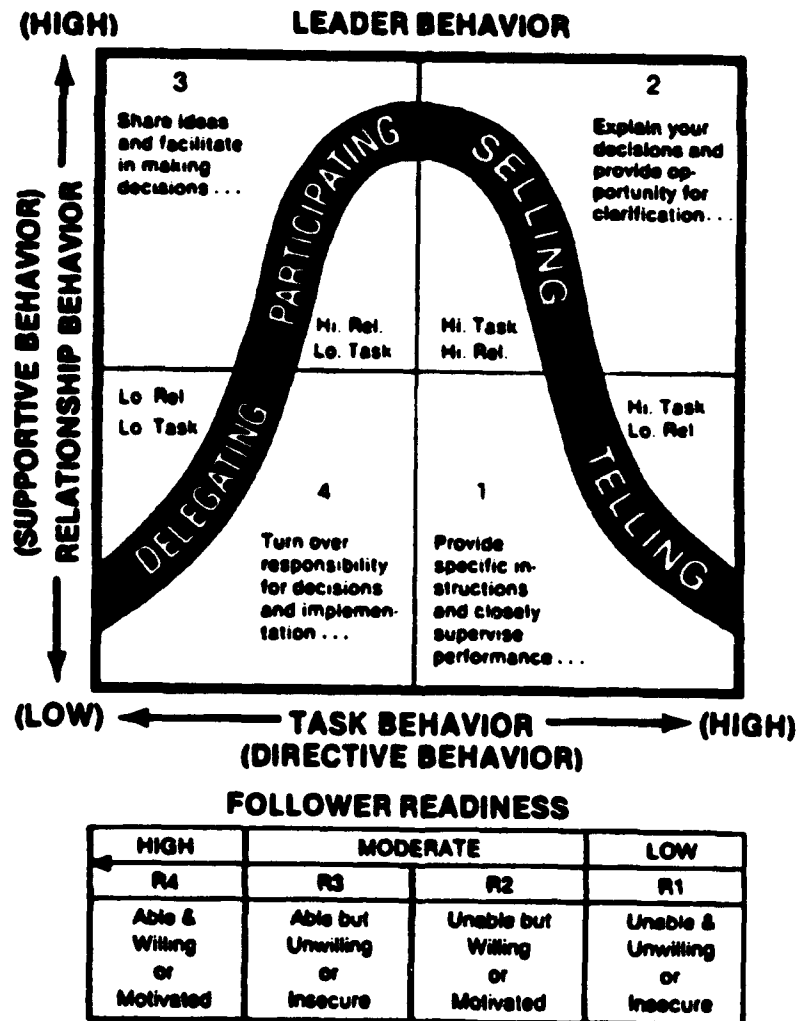and makes the decisions (Hersey 1984 p. 65). The human factors of the change will be

Figure 3. The Hersey Situational Leadership Model
Paul Hersey, The Situational Leader. Copyright © 1984 Center for
Leadership Studies.
Reprinted by permission.

recognized and understood most easily by the people who know the problem best. The final style (Leadership Style 4) comes into play once the action plan is in motion. It is called "Delegating" because the leader turns over the responsibility for decision making and implementation to the follower (Hersey 1984 p. 65).

D. APPLYING CHANGE MODELS TO CALCOMP

1. Step 1: Defining the need for Change

In the words of Beckhard and Harris "The forces requiring change in large systems today tend to originate *outside* the organization" (Beckhard 1987 p. 30). CalComp, in an effort to conform to the requirements of Reg. 15 was thrust into a situation of this type. The SCAQMD was the outside force that made Jack Downey, CalComp's Ride Share Coordinator, consider changing their rideshare programs to include telecommuting. In this case the NEED was well defined and the pressure of completing the two-year traffic reduction plan increased the need to find a way to solve the problem. Downey developed the basic plan and presented it to upper management for discussion. It was in this forum that the question of "Why change?" was addressed, and the need and degree of change for CalComp was developed.

Downey, meeting with the other managers at CalComp to determine the future of the program at CalComp were acting in a Hersey Style 3 management style. This style has high relationship and low task behavior and is earmarked with "high amounts of support and encouragement and an opportunity to discuss things" (Hersey 1984). After open discussion and amendments were made, upper management took the idea to the

middle managers for review. As this developed, upper management then turned to selling the new ideas to the middle mangers and allowed them to understand the issues (Hersey Style 2). Using this approach CalComp was able to bring in more of the management team to now plan where CalComp was going with the new concept "Telecommuting" or in Beckhard-Harris terms determining the future state.

2. Step 2: Determining the Future State

CalComp's future state was developed in much the same way as the defining the need; using a systems approach with the Rideshare Coordinator as the program manager and all of CalComp's management as members of the team The CalComp *Team 90 Manual* describes the systems approach this way:

> CalComp's system approach follows a cross functional or multi - disciplinary team concept . . . The one focus of every member of a cross-functional team is completion of every task as early as possible in the development cycle. . . the team must have total regard for the needs and priorities of interacting functional organizations . . . Every development program at CalComp is led by a program manager.

Using the same pattern for management as their normal design and manufacturing, the demography of CalComp's workforce was reviewed. A realistic percentage of workers who would be able to work remotely was developed. CalComp has approximately 900 employees; 55% live within 5 miles of the home office in Anaheim. In view of Reg. 15 requirements, that only left 45% of the employees to consider for remote work. Further, CalComp had placed restrictions on where the remote work could be done from, therefore it was estimated that the Telecommuting Program would only involve a maximum of 100 employees telecommuting. With the future state

being this small (approximately 10%) CalComp added this future state to their two-year

plan. Defining the present state was next, and the job of Jack Downey.

3. Step 3: Defining the Present State

The present state in this case was really an ongoing process of review of all

the rideshare options at CalComp. The AVR numbers were calculated on a continuous

basis to monitor the effectiveness of all of the traffic reduction programs. The present

state was what CalComp had submitted in its first two two-year traffic reduction plans,

and the current program had not been enough to satisfy SCAQMD. Which goes back to

CalComp's need for change. But defining the future state is more than just looking at one

requirement. Downey also had to balance all of the other programs (Van Pools, Car

Pools, Bike Give Away, Monetary Reward System, etc.). Additionally, he have to review

the goals for the Rideshare Program to get a full view of where CalComp was in helping

employees get to work on time and ready to work.

4. Step 4: Transition Management

The transition from the present to the future state and bettering the AVR for

CalComp, meant developing a limited telecommuting program, and as more centers

developed, expanding the program to include more employees. At this point Downey and

CalComp shifted to Style 4, "Turn over responsibility for decisions and implementation

(Hersey 1984)", and the actual management of this program was delegated to the

managers with telecommuters. These managers, described as ". . . all leading edge types.

They understand change here at CalComp and can make things happen. . . .", set all of

the individual parameters for each telecommuter and worked out all of the schedules at

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the center. As one of CalComp's managers put it ". . . telecommuting impacts supervisors more than anyone . . . supervisors know best if a person can telecommute. . . ." Downey implemented a pilot program using TWRC and the people living in Riverside's zip code. The pilot program is currently operating with all telecommuters at the center one day a week.

5. Summary of Analysis

CalComp, in every phase of consideration of the telecommuting concept, used a iterative process similar to the Beckhard-Harris model (Figure 2). Lead by Jack Downey, CalComp defined issues and problems and used a systems approach to overcome each of these until a successful design was developed. The process used was not new to CalComp, but an application of the process that they use as they approach products, processes, or design. Additionally, CalComp had commitment. At each step, at each decision, the people (managers and employees) were involved. It was not just Jack Downey or just upper management reviewing the ideas, it was team effort. CalComp had many of the same issues as all of the companies telecommuting, but found answers and moved on.

V. CONCLUSIONS AND RECOMMENDATIONS

A. RESEARCH CONCLUSIONS

This case study of the implementation of telecommuting by CalComp at the

Telecommuting Workcenter of Riverside County is a example of the management issues

that surround telecommuting. Prior research reveals that a telecommuting program has

the following issues and benefits:

Issues

- Loss of control
- Managing remote employees
- Inadequate facilities / technology
- Communications
- Productivity
- Impact on customers
- Legal issues/union restriction
- Selection of employees

Benefits

- Flexibility: a system that has proven to be successful with many different types of organizations
- Efficiency: increases productivity (gains from 10% to 30%)
- Economy: decreases the cost of transportation for the commuter, reduces down time and lost time from absenteeism and stress related medical problems, and in some cases reduces the cost of office space
- Environmental Soundness: better for the environment by decreasing transportation requirements
- Morale Enhancement: improves the overall quality of life for the commuter

These points are supported by telecommuting studies of transportation and the

environment, the conclusion being that telecommuting is good for the environment and

can greatly reduce the strain on the highway infrastructure of the United States. These

studies have also shown that there is an increase in productivity and a decrease in absenteeism in organizations using telecommuting. (NRC 1985, Nolan 1989, JALA (a) 1990, Hawaii 1991, Washington (b) 1992)

The findings of this study support these conclusions. Additionally, this study develops a view of what type of organization is successful at telecommuting and which type is not. The organizations that are large bureaucratic structures and slow at accepting change have had problems implementing and supporting telecommuting. Organizations that are change oriented had less trouble implementing and sustaining telecommuting. The programs and projects that are successful (e.g., Blue Cross / Blue Shield, Hawaii Telecommuting Program) are the ones that use some type of change management to approach the implementation of telecommuting. In the terms of Beckhard and Harris, they completed the four steps of: (1) Defining the need for Change, (2) Determining the Future State, (3) Defining the Present State, and (4) Transition Management . In some cases not all of the steps were used and the program / project did not reach the level of success hoped for by the organization or group developing the telecommuting program (e.g., Flexiplace Program, Telecommuting Workcenter of Riverside County, Washington State Energy Office Demonstration). The programs that found a driving need for change, identified the degree of change, developed a desired future state, and effectively managed the transition were more successful at developing a lasting change to telecommuting. For example, in both the Blue Cross / Blue Shield and Hawaii telecommuting programs, pressing and needed change was identified, and telecommuting was chosen to be the change to answer that need. The programs reviewed the present, set goals for the future,

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and developed a program to achieve their goal. In both cases the programs were successful and fully supported.

In contrast to these programs, are programs that were less clear in their need for the change. The federal program Flexiplace is a good example of this; the program is successful on a limited scale and has only expanded to a fraction of the projected goals (OPM expected up 1,000 participants by 1991 but only had 350) (U.S. Merit Systems Protection Board 1991). Why? Because the definition of the need for change is not understood or shared by all of the federal departments that should be using the Flexiplace program. Without this shared understanding of the need, the future goals could not shared. Another example of this is the low usage of the Telecommuting Workcenter of Riverside County. Companies that could be using the center do not hold the same vision of the need for change. They all have a similar present, but all have different views on the future and how to get there (Morton 1992).

The Washington State Energy Office (WSEO) Telecommuting Demonstration is another good example of a program that was trying to demonstrate the concept in order to help other organizations understand the NEED for the change to telecommuting. The WSEO project increased the awareness of telecommuting to a large region of Washington State and was by all accounts very successful. However, even 25% of the supervisors in this program did not want to continue. The supervisors supported the pilot, but, when they needed to commit to a permanent program, they resisted the change. The reasons given ranged from not have funds available for telecommuting, to a feeling that a long term commitment required further research before continuing. This can be a

possible failure of the fourth step — managing the transition. (NRC 1985, Hawaii (a) 1991, (b) 1992, JALA (a)1990, Washington (a) 1992, Beckhard 1987)

This case study illustrates this unaddressed aspect of telecommuting and that is as the management of change. As CalComp showed, as you increase the readiness for change and change management, the list of concerns associated with telecommuting dwindles. The real areas of concern are technology, and training. But the true issue of telecommuting invites change and all the related concerns, problems and issues can be understood and addressed through effective change management.

B. RECOMMENDATIONS

1. Future Research

Even though telecommuting has been around since the early 1970's there have not been any studies of the long term effects of telecommuting on the corporate culture of America. If, as this thesis concludes, the issues around telecommuting are based in change, then the long term topic for research should be telecommuting and the management of change. All current studies are on pilot programs, and programs of less than three years duration. Telecommuting needs a study that follows a person or organization through long term (5 - 10 years) change to find the true impact of telecommuting as a *CHANGE*. The following are additional research questions that should be addressed:

- What are the military applications of the telecommuting concept?
- What are the effective approaches to change management in institutionalizing telecommuting?
- What is the long term impact of telecommuting on organizations?
- What is the long term potential for telecommuting?
- What are the potential net regional impacts of full-scale telecommuting on traffic congestion, air quality, and energy consumption?
- What are the long term effects of telecommuting on land use and mobility?
- What are the long term effects of telecommuting on the normal employee supervisor relationships?
- What are the social impacts of reduced personal interaction due to telecommuting?

2. Department of the Navy (DON)
a. Introduction

The concept of remote workers is not new to the Navy. The forward deployed units have carried out their jobs away from the Battle Group or Joint Commanders for years. However, the staff for the Battle Group or Joint Commander was always located in the same area as the commander. In *Defense for A New Era: Lessons of the Persian Gulf War,* one of the highly successful lesson was the integrated air campaign. This campaign choreographed thousands of daily air sorties into the theater of operations "all without a single midair collision or accidental shoot-down of friendly aircraft (House Armed Services Committee 1992 p. 9)." Even with this success, the staff of the Joint Forces Air Component Commander (JFACC) was criticized for forcing "Air Force approaches" on the other services. If the concepts of telecommuting were applied, JFACC could have had the best possible personnel from all services working on his staff. The U.S. military has the best educated, motivated, and capable force now than any other time in history (House Armed Services Committee 1992 p. 21). We must now explore new ways to use this resource. Developing a peace time telecommuting program would

help train Navy personnel for being part of a remote staff. A conceptual application of telecommuting for the Department of the Navy (DON) could be to allow selected officer and enlisted detailers to telecommute up to three days a week.

b. Detailer Telecommuting Program

The job of a Navy detailer is to be the personal liaison between the officer or enlisted person and the placement officer. The placement officer is responsible for filling requirements of commands needing personnel assigned to their command. This entails a great deal of time spent on the phone talking to the personnel awaiting orders. Detailing also requires time spent matching people to jobs in order to meet the needs of the Navy and the people being served. This is a complicated process requiring timing, technical reviews, professional knowledge, and skill to make the system work properly.

The files and data needed to carry out this task are kept in the Navy's Bureau of Personnel (BUPERS) computer system. The detailer, when reviewing the options for orders, calls up the record of the person, gets the required information, then calls the billet (job) list that is available for that person. After the review, when a compromise has been reached by the detailer and servicemember, the orders are prepared and sent to the placement officer for approval. The job of a detailer is far more complex than this brief description, but this is the main mission of the job. With the aid of telecommunications and a computer, a detailer could easily perform this mission of the detailing job from any location.

When a servicemember calls a detailer the receptionist answers, asks for name, social security number, and the name of his / her detailer. After this basic

information, the connection to the detailer is made. To the servicemember, the location of the detailer doesn't matter. The assumption is that the detailer is located in the same office as the receptionist, but service to the customer is all that counts to the service member — not location. Remote access would be transparent. This remote access would also give detailers on the road a way to log into the database to work real time with servicemembers as they discuss the future of their careers. The process of detailing would remain the same, only the technology used would change.

This remote access could be made by any of the following options, but, all options require that the BUPERS install a call forwarding or switching system to maintain a central point for the servicemembers to call and contact their detailers. This system could be an off-the-shelf purchase similar to many service center voice system. The three options, tied to the three types of telecommuting as defined in chapter one, for the remote site are:

- **In home option (Work at home)**
    1. Install the required phone lines at the detailer's home — one for data and one for voice.
    2. Issue a Laptop Computer or insure that a compatible computer is in place.
    3. Install a high speed Fax/Modem or ensure a compatible high speed Fax/Modem is in place.
    4. Install a printer or ensure a compatible printer is in place.
- **In other Federal facilities (Satellite office)**
    1. Locate a federal facility that is close to the detailer's home and secure space for the detailer telecommuting program.
    2. Install the same equipment as required in the in-home option.
- **In the new Flexiplace Telecommuting Centers (Neighborhood Work Center)**
    1. Locate the Flexiplace Telecommuting Centers that are close to areas that the detailers live and secure space for the detailer telecommuting program.
    2. Configure the installed equipment at the center to interface with Bupers.

(1) Work at Home. The in-home option could easily be accomplished at low cost. With the widespread ownership of laptop computers and PCs throughout our society, the computer equipment required could possibly be in place before beginning the program. The phone lines required could be filled with a ISDN BRI line at approximately $30 to $50 a month. This would allow the detailer to have both voice and data lines with the installation of only one new line in the home. The ISDN line would also have the potential to transmit data faster than a high speed (9.6 or 14.4 kbps) modem alone.

(2) Satellite Office. The second option would be more costly unless a Navy facility could be used at no cost. For example, a satellite recruiting station with a desk that is not used on the days that the detailer would be telecommuting, or room for a desk to be installed for the telecommuter. If Navy facilities are not available, then additional costs would occur due to having to acquire space in another agency's facility. The equipment would also have to supplied, but this option gives the opportunity to allow more than one detailer to telecommute. On different days, different detailers could use the facilities and spread the cost over more personnel.

(3) Neighborhood Work Center. The final option is to utilize the new Flexiplace Telecommuting Centers. These centers placed around the greater Washington, DC area, no closer than 20 miles of the District of Columbia, but no farther than 200 miles, would have equipment set up in a manner similar to the other two options and would truly be a multiple user location (United States House of Representatives 1992).

c. USN Management and Detailer Issues

The Navy's management will have to face the same issues as all corporations. However, in interviews with officers that have been detailers, managers of detailers, and managers of other shore facilities, the major resistance to change will be (1) loss of control (2) coworker issues and (3) perceived productivity problems. The detailer have the same issues as the telecommuters in the CalComp case study, with one additional area; that of promotablity. The problem with promotability is that officers and enlisted personnel are promoted on observed leadership and observed ability to handle stress along with their ability to professionally perform their assigned task. The issue is one of "out of sight, out of mind" and the fear is that servicemeber's work may not be viewed as equal when being compared to someone that is in the office all of the time. These issues follow the same pattern as that of all pre-telecommuting organizations, and if viewed as a change management problem, could be migrated to a less problematic issues or removed completely.

d. Possible Solutions

The Navy has a long history of rigid military controls and a large bureaucratic organizational structure. Historically, this type of organizational structure is difficult to change. The type of ingrained culture is strong, and change will have to be slow to be successful (Kotter 1992). The Department of Defense and the Department of the Navy have started a program to change the culture of the Navy's management and leadership. This program is the Total Quality Leadership (TQL) effort that has been applied to various commands over the last few years. The TQL program is very closely

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related to the Total Quality Management (TQM) programs that is being used in the civilian corporate world. This quality and systems approach is the same concept that CalComp uses, and BUPERS should have the same center as CalComp's TQM driver, customer first all-ways. As with CalComp, through analysis of need, benefit, and barriers, deterrents issues can be reduced to a point where the concept of telecommuting would be acceptable.

The Navy has a driving need for change and has identified the direction for change in the TQL program. The need for telecommuting, as a change, is in both the need to reduce traffic and reduce air pollution in the DC area. The tools for change are in place. For telecommuting at BUPERS the Navy mission is clear, and telecommuting with TQL could help to successfully complete the mission customer first all-ways.

APPENDIX A

CALCOMP INC.
A Lockheed Company

INTEROFFICE COMMUNICATION

TO: Company Officers   IOC NO.:92-CF-123
FROM: C. Furniss   DATE: May 8, 1992
SUBJECT: CALCOMP Pilot Telecommuting Program MS/EXT.: 5/2348

Effective May 15, 1992, CalComp is implementing a pilot telecommuting program for a limited number of qualified Anaheim employees. The initial term of the pilot program will be three months. Under this program, the telecommuter will work up to two (2) days per week at the Telecommuting Work Center of Riverside County. Details of the program are set forth in the CalComp Pilot Telecommuting Program (the "Program").

The purpose of this memorandum is to formally announce the program and to set forth a basic statement of CalComp policy regarding this pilot program. Jack Downey will contact you or your managers regarding participating departments and employees.

POLICY

Through the Pilot Telecommuting Program, CalComp seeks to provide an alternative to working every day in the central office location. Telecommuting is the process of working at a remote site and using telecommunications to stay in contact with the central office. Expected results will be improved employee productivity and personal job satisfaction in addition to contributing to the attainment of the Average Vehicle Ridership goals mandated by the South Coast Air Quality Management District. CalComp recognizes that telecommuting may be a viable option for its employees and will use the Pilot Telecommuting Program to evaluate the benefits to CalComp and its employees.

POLICY GUIDELINES

1.   Telecommuting is a voluntary cooperative arrangement between supervisor and employee; it is not an entitlement or a privilege.

2.   Selection of employees to participate in the Pilot Telecommuting Program will be limited to employees in participating departments and to employees who meet the criteria set forth.

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3.   Criteria utilized in selecting participants will include suitability of the job and suitability of the employee.

   a)   Jobs suitable for telecommuting are characterized by clearly defined tasks and deliverables. These are jobs measured by results and that do not require performance at one certain location. Jobs that are not suitable for telecommuting are those that require immediate responses; require equipment that must remain on CalComp premises; or require use of confidential files that cannot be removed from CalComp premises.

   b)   Employees suitable for telecommuting are reliable, able to work with minimal supervision and usually are goal-oriented. Employees who require the daily social and professional contacts available at the central office complex 'are generally not suitable telecommuters.

4.   Each telecommuter will be required to sign and abide by a Telecommuting Agreement. The Telecommuting Agreement will contain the specific terms and limitations applicable to ,the particular telecommuter and shall also be signed by the telecommuter s supervisor.

5.   A telecommuting arrangement may be terminated at any time by either the Company or the employee, without cause.

6.   The telecommuting arrangement will not alter' or affect the status or pay classification of the employee's position.

7.   All telecommuters and their supervisors will be required to complete monthly Telecommuting Reports and any other surveys, forms or reports requested by CalComp in order to allow CalComp to effectively evaluate the Program.

8.   The Program will be coordinated by CalComp Telecommuting Coordinator who will oversee scheduling of the off-site office facilities and will have final authority with regard to all telecommuting schedules. All telecommuting arrangements and any changes to telecommuting arrangements must be approved in advance by the Telecommuting Coordinator.

9.   Frequent feedback and good communications between the supervisor and the telecommuting employee are essential to the success of this program.

RESPONSIBILITY

The Telecommuter is responsible for completion of all the employee's job requirements; adhering to the terms of the Telecommuting Agreement, including, without limitation,

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the schedule set forth therein; and, completing all requested surveys, forms and questionnaires.

The <u>Supervisor</u> is responsible for selecting suitable employees for telecommuting; evaluating the telecommuter's performance to ensure that the employee continues to meet the necessary criteria for telecommuting, including, without limitation, adherence to the terms of the Telecommuting Agreement; and completing all requested surveys, forms and questionnaires.

The <u>Telecommuting Coordinator</u> approves all Telecommuting arrangements and any changes to such arrangements; maintains the scheduled use of the remote facilities; interfaces with the Telecommuting Work Center of Riverside County; collects all surveys, questionnaires and forms required of all participants; and interfaces with CalComp management on all aspects of the pilot program.

SUMMARY

After completion of this pilot program, the results will be evaluated. Based upon those results, the program utilizing satellite work offices may be extended and/or expanded. In the future, CalComp may also consider a pilot program allowing home telecommuting on a part-time basis.

Charles Furniss
Sr. Vice President
Human Resources / Administration

cc: Company Officers Direct Reports

ss/2587

CALCOMP TELECOMMUTING AGREEMENT FOR PILOT PROGRAM

_____ ("Employee") agrees to participate in CalComp Inc.'s pilot telecommuting program (the "Program") under the following terms:

1. This Agreement shall be effective as of _____, 1992, and shall remain in full force and effect as long as Employee telecommutes, unless sooner terminated as provided for hereunder.

2. Employee agrees to perform services for CalComp as a telecommuter at the Telecommuting WorkCenter of Riverside County ___ day(s) a week during the term of this Agreement. On the days Employee telecommutes, Employee's work hours will be ___ a.m. to ___ pm..

3. Participation as a telecommuter is entirely voluntary and is available only to employees deemed eligible in CalComp's sole discretion and there exists no right to telecommute. CalComp or Employee may terminate the telecommuting arrangement with or without cause, at any time, effective immediately. CalComp will not be held responsible for any costs, damages or losses resulting from cessation of participation as a telecommuter. This Agreement is not a contract of employment and may not be construed as such.

4. Employee's compensation, benefits, work status and work responsibilities will not change due to participation in the Program.

5. The amount of time Employee is expected to work per day or per pay period wil not change due to participation in the Program.

6. CalComp will be liable for injuries or illnesses that occur during Employee's agreed-upon work hours. Employee's work hours will conform to the schedule set forth in Paragraph 2 above. If such a schedule has not been agreed upon, the employee's work hour will be assumed to be the same as it was before Employee began telecommuting. Any changes to Employee's telecommuting schedule must be reviewed and approved by Employee's supervisor and CalComp's Program Coordinator in advance.

7. Employee agrees to practice the same safety habits in the designated workplace as in Employee's office on CalComp's premises.

8. In the case of an injury while working off-site, Employee will immediately report the injury to Employee's supervisor or to Employee Relations to get instructions for obtaining medical treatment.

9. Restricted-access materials will not be taken from CalComp's premises without the prior written consent of Employee's supervisor.

10. Employee will complete and return any Telecommuting Reporting Forms and any other requested forms, reports or surveys. Employee agrees to participate in all studies, inquiries, reports or analysis relating to telecommuting for CalComp or for any governmental entity.

11. Employee remains obligated to comply with all CalComp rules and policies.

_____   _____
Employee   Supervisor
ss/2554

APPENDIX B

A. FOUNDERS

STATE OF CALIFORNIA
As one of the initial founders of the Telecommuting Demonstration project the State of California contributed $100,000 for F year operations of the project.

RIVERSIDE COUNTY TRANSPORTATION COMMISSION
As one of the initial founders of the Telecommuting Demonstration Project RCTC provided $100,000 for first year operations of he project.

PACIFIC BELL
A Pacific Telesis Company
Pacific Bell contributed over $52,500 in cash and stall time valued at $4,000.

THE ECONOMIC DEVELOPMENT PARTNERSHIP, INC.
The Economic Development Partnership, Inc. donated a facsimile machine valued at $1,500. EDP also leased space at the WorkCenter for use by employees who are working in the area, but are not considered part of the demonstration program.

B. SPONSORS

THE SOUTHERN CALIFORNIA EDISON COMPANY
Southern California Edison contributed $15,000 in cash to the program and also occupied two private offices with two workspaces in each office.

STOCKWELL & BINNEY
Stockwell & Binney loaned furniture valued at $12,000 to the WorkCenter for use in the one year project.

C. DONORS

COMMUTER TRANSPORTATION SERVICES, INC. (CTS)

CTS donated in-kind services valued at $4,800 to assist in the marketing of the WorkCenter, the assessment of the telecommuters and their supervisors. In addition, CTS offered training support.

IBM

IBM donated a personal compute and printer for use by the WorkCenter Manager valued at $4,000

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD)

The SCAQMD donated $2,500 in cash in support of the Telecommuting WorkCenter, and the use of surplus phones for he demonstration period.

SOUTHERN CALIFORNIA GAS COMPANY

Southern California Gas Company donated $2,500 to sponsor the Grand Opening Celebration, which was held on November 18,1991.

THE LAW FIRM OF THOMAS, LUEBS & MORT

Thomas, Luebs and Mort donated legal services toward the opening of the WorkCenter valued at $5,000.

XEROX CORPORATION

Xerox donated a copy machine for the WorkCenter valued at $3,600.

D. CONTRIBUTORS

THE RIVERSIDE CITY COUNCIL

The City of Riverside contributed $2,000 toward the implementation of the WorkCenter.

PACTEL MERIDIAN SYSTEMS

PacTel donated telephone headsets valued at $2000.

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